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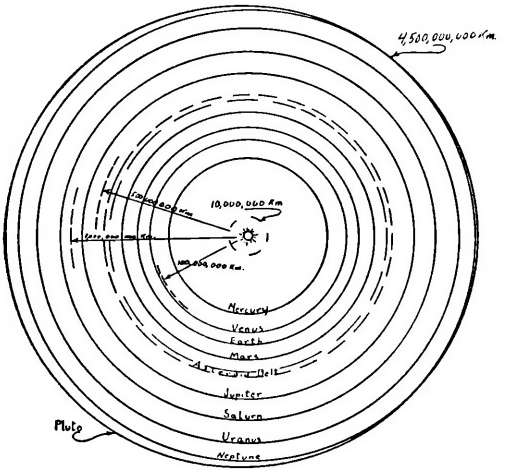
THE SIZE OF THE SOLAR SYSTEM



IT'S OFTEN been said that the Solar System can't be drawn to scale on a single sheet of paper of manageable size. Inasmuch as Mercury is about 50,000,000 kilometers from the Sun, and Neptune about 5,000,000,000, it seems fairly clear that you can't draw those orbits usefully. If Neptune's orbit is represented by a 5-inch radius, Mercury's must have a 0.05

inch-radius. Even Venus' orbit would be only 0.1 inch.

Nevertheless, herewith is a map of the Solar System drawn very carefully to scale, on a heliocentric basis. The scale is accurate. It's easy to draw it to scale on a useful piece of paper—not a bedsheet—if you do what any engineer does when he runs up against a natural phenomenon that follows a simple logarithmic or exponential function. He uses a logarithmic graph, of course. The distances of the planets on the accompanying map are drawn to scale—to *logarithmic* scale.

The trouble with our thinking—and I am not excepting present company; we science-fictioneers have been just as thoroughly tradition-minded as anyone else on this!—is that we have gone on thinking of maps in terrestrial terms—which means linear mapping.

Every major function relating to the Solar System is, however, an exponential phenomenon. Light-intensity falls off as the inverse square. So does gravity. And the distances between the planets go exponentially also; that's the essence of Bode's Law.

In the first quarter of this century, astronomy books for children used to have drawings of the Solar System showing the orbits of the planets, with railroad tracks sketched in, and labels like "158 years—Earth to Jupiter." In the second quarter of the century, they drew airplanes flying four hundred miles an hour, instead of trains going sixty miles an hour. The results were essentially the same.

Now they're drawing rockets—but the results are curiously similar.

Actually, a rocket behaves in almost exactly the way a train or plane does; like those vehicles, it accelerates for a very short time, and then runs at constant speed. In the case of the space rocket, the constant—or near constant—speed is true coasting; for the train and plane, the constant speed represents the equilibrium between available power and friction losses.

But—a rocket, like older vehicles, travels essentially according to a linear equation; distance covered equals a constant multiplied by time.

In fact, the rocket is worse off; it has to take a curving segment of an orbit, some fraction of a conic section, between source and goal. The direct-line distance from Earth to Mars may be 50,000,000 kilometers—but a rocket takes an orbit curve that requires something nearer 500,000,000 kilometers.

That means the Earth-Mars trip takes many months.

And it is essentially linear-equation travel. So mapping the System on a linear scale seemed perfectly reasonable.

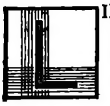
We've had a little experience with rockets now. No possible improvement of rockets could ever make interplanetary commerce economically attainable.

To examine that, let's go whole hog on the concept of super-dooper rockets. We'll assume a one hundred

(*Continued on page* 176)

Illustrated by Gardner

STAR



IEUTENANT General John Wilforce knew the saying that trouble comes when least expected. It occurred to him as he finished his shower and toweled briskly. He was still considering it as he slid between the cool sheets for his first full night's sleep in six months.

Wilforce lay still, hearing the rumble of the automatic loaders that poured fuel, food, and ammunition into the flagship's tanks and storerooms. In his mind's eye, he could see the ships of his fleet. Most of them, like his own, were drawn close to the starlit framework of girders, drums, crates, and pressurized spheres that was Space Center 12. From these ships, thousands of his men were now streaming into the bars, game rooms, and psychosynth parlors of the Center, eager for a few hours of release and forgetfulness after the brutal months on Inferno.

Before letting himself fall asleep,

TIGER

By CHRISTOPHER ANVIL

Sometimes it's much easier to get into something than to get out — to get than to get rid of. A disease, for instance. But what they caught on that planet wasn't a disease . . . exactly . . .

Wilforce reviewed his precautions. He had detached a strong squadron of the fleet to reinforce the guard ships of the Center. Half the men in each ship now reloading at the Center were on board, ready for duty at a few minutes notice. Moreover, the latest reports showed no sign of trouble whatever, anywhere in his sector.

Satisfied that he had done his job, the general pulled the covers close around him, and fell sound asleep. Unnoticed as he slept, the hands of the clock on the communicator by his cot swung slowly around their dial until, in the early hours of the morning, a red light blinked on.

Wilforce woke with a hammering clang in his ears. He threw back the covers to see the communicator's red warning light flash on and off. Then the screen flared into life:

CLASS A EMERGENCY!
CLASS A EMERGENCY!
CLASS A EMERGENCY!

Wilforce swung to the edge of the cot and hit the "Receive" stud. On the screen appeared a man with three stars at his collar and his shirt plastered to his skin with perspiration. Clouds of vapor rolled past behind him as he said: "General Wilforce?"

"Right here." Wilforce snapped on the room light so he could be seen. He recognized the man now as Larssen, armed forces commander in a sector bordering his own.

Larssen, a note of strain in his voice, said, "General, are you still tied up on Inferno?"

"We just got back from it."

Larssen hesitated barely an instant. Then he said, "A little over the border from you in my sector is a sun system called Bemus. There are colonies on the third planet, and they've been there better than ten years with no trouble. I also have a small rest camp on the planet. At last report, a month ago, everything was fine."

Larssen paused, then said, "Three days ago, a destroyer of mine crash-landed on Bemus III. Every colony there has been smashed. All records, books, food, and clothing are gone. Weapons are strewn all over. There's not a human being left. There are abundant tracks of animals entirely different from those native to the planet, but the animals themselves aren't to be seen."

Wilforce listened intently.

Larssen went on. "The detector network shows nothing approaching or leaving the planet. The result is, I don't know what happened on Bemus III. Right now nearly everything I've got is tied up. Yet, if something can get past the detector network and wipe out a whole planet, I can't ignore it. Can you help me?"

Wilforce said, "I'll do everything I can."

Larssen thanked him fervently, and promised to have his staff send immediately every scrap of information available about Bemus III. The screen blanked, and Wilforce punched a number on a vertical row of buttons to the left of the screen. The

competent, slightly pudgy face of Rybalko, his chief-of-staff, appeared.

Wilforce said, "Did you hear that, Balky?"

"Yes, sir," said Rybalko. "I heard it."

"How long will it take us to load up?"

"Sir, to do it right will take another five days."

Wilforce thought a moment. If he waited, the trouble, whatever it was, might have time to develop. If he immediately took his full fleet to Bemus, he might by sheer force crush the thing at its beginning. On the other hand, experience told him that he might find himself making gestures in empty space, and be forced back in a few weeks for lack of supplies. He made up his mind, and glanced at Rybalko.

"Balky, get a light task-force together to prowl around Bemus system. Load a D-transport with Pioneers to scour Bemus III and piece together what's happened. Put a combat group on another D-transport to back up the Pioneers. Then get in touch with the destroyer that crash-landed on the planet. I'll want to talk to the commanding officer."

"Yes, sir."

Wilforce got up, splashed cold water on his face, and got dressed.

The destroyer's commanding officer turned out to be a spare major with craggy features.

Wilforce said, "Major, exactly where are you on the planet?"

The major held up a map. "Sir, we're in the planet's northern hemisphere here, about three hundred miles southwest of the rest camp. The terrain where we came down is a gently-rolling, dry, grassy plain. We're at the point marked "X" here on the map, about twenty-seven miles north of the big loop of this river."

"What's your situation right now?"

"Well, sir, we have plenty of supplies. An abundance of fresh meat. And we haven't been threatened in any way. We've scouted the five-hundred mile radius of territory we can cover thoroughly with our light fliers, and we've let out Bats and Probes to scout farther out. We can't find anything that looks dangerous—except that the colonies and rest camp have been totally wiped out."

"Have you taken pictures?"

"Yes, sir. As soon as we realized what had happened, we started taking them. We're getting ready to send you a batch on the trifac right now."

"Good work. Now, how did you happen to crash-land on the planet in the first place?"

The major hesitated. "Sir, to be perfectly honest, I don't know *what* happened. None of us knows. We were making a routine sweep through this part of the sector, and swung close to the planet because we couldn't get any response from the communications center down at the rest camp. Then something hit the ship like a hundred tons of lead. The next thing we knew, the air was

whistling out. Seams parted here and there the whole length of the ship, and we barely had time to get into suits. There was nothing on the detectors that could have caused it, but there we were just the same. I decided to set down on the planet to replenish the air and repair the ship. But we'd had even more damage than I realized. On the way down, several drive tubes blew their linings, and a gravitor broke loose from its mount. That was how we came to crash-land on the planet."

"Do you have records of your detector readings?"

"Yes, sir. We can run the record tapes through the trifac if you'd like."

Wilforce said, "Yes, do that, from the time you entered Bemus System till you landed on the planet."

"Yes, sir."

"How are your repairs coming?"

"We expect to have the seams sealed up, the gravitor mounted, and the tubes lined in about two weeks, sir. Straightening the frame will be a job for the yards at Main Base. But we should be able to get back all right."

Wilforce thought a moment. "Major, take several three-dimensional photos of the damage to your ship and send them along, too."

"Yes, sir."

"Is there anything else that seems important to you?"

"No, sir. Nothing I can think of."

"All right. Have your communications officer signal us every hour, and get in touch with us right away if anything further happens."

"Yes, sir."

Wilforce broke the connection. Shortly afterward, the first reports and photos of the colonies came in on the trifac.

Wilforce first located some maps in the growing pile sent in by Larssen's staff. The maps showed the colonies on a gently rolling, heavily forested plain. They were located in a circle several hundred miles across, with Larssen's rest camp in a cleared rectangle near the center.

Looking over plans and photographs, Wilforce saw that the individual settlements were large clearings near lakes or streams with L-shaped rows of cabins along the south and west edges of the clearings. But these rows of cabins were laid out differently from those Wilforce had seen on other heavily-forested planets. Instead of being simply straight rows of cabins, each cabin was turned roughly thirty degrees from a line due south or west. From above, each row of cabins suggested a row of dominoes lined up end-to-end, separated to leave spaces between them, then each pivoted thirty degrees about its center.

Wilforce puzzled over this till an explanation dawned on him. In a straight row of cabins, gunfire from one cabin couldn't reach the space close to the front or rear walls of adjoining cabins. By turning each cabin, its front and rear walls could be protected by neighboring cabins.

The next thought to occur to Wilforce was, "*What* enemy?"

Methodically, he worked his way through reams of information on the planet, and wound up some time later with a faint pain between the eyes, and a summary of all the data that seemed to count:

"Bemus III is an Earth-type planet, with ideal gravity and atmosphere, a reasonably pleasant climate, and a somewhat longer than standard year. It has few mineral resources, but rich soil and abundant forests. There are no plants or animals harmful to man. The largest life form is a placid, herbivorous, mammothlike creature called a 'cropper' which is protected by Planet Certification because it is nearly extinct. The other herbivores are small. The largest carnivore is a shy nocturnal creature little larger than a rabbit. Man has no enemies on Bemus III."

With this fresh in his mind, Wilforce reached for photographs and diagrams of Larssen's rest camp. A glance showed him that the camp was made up mostly of tents and prefabricated one-story barracks put up and taken down as needed. Then Wilforce looked at the only permanent buildings in the camp—the communications center.

Built in a tight hollow square, from the middle of which rose a covered tower mounting a machine gun and a big searchlight, the communications center was surrounded by a stockade of upright logs, sharpened on the ends. A barrier of packed earth filled the space between this stockade and an outer log wall that looked from above like a four-pointed star. Emplaced within the barbed-wire-strung arms of this star were heavy machine guns and multiple rocket launchers. Outside was a broad deep ditch ringed with more barbed wire.

Wilforce looked at this a moment, then glanced back to the reports that described Bemus III as a peaceful harmless planet. He carefully checked to see if by any chance he was reading data on two different planets with similar names. When he was satisfied that this wasn't the trouble, he glanced with a deepening scowl at the pile of recent photos sent in by the destroyer.

These photos showed solidly-built cabins knocked askew, doors smashed in, guns still at windows and loopholes, axes and unsheathed knives strewn on the floors. At the communications center, the massive logs at one part of the outer wall were snapped back like toothpicks. The earth behind was pulled down as if by a giant hand, with a machine gun lying in the dirt at the bottom. Two of the communications buildings were knocked apart. The tower had long spintered scratches, several braces torn loose, and its roof ripped open.

Wilforce looked at one photo after another, then at the views of the destroyer with its side flattened in the aft section and slightly dished-in forward.

Frowning, he had several photos of the rest camp and the ship enlarged.

The ship appeared to have been hit by a solidly-built cylindrical object about its own size, and nearly parallel to it at the time of collision. The enlarged photos of the ruined colonies showed deep parallel scratches in cabin walls, big paw marks in the dirt outside, and in one place behind a low swell of the earth, the outline of an enormous body with fan-shaped marks in the earth behind it. This suggested to Wilforce a huge cat crouched in wait and thrashing its tail.

Scowling, Wilforce put down the photos, and went out to make a quick check of the condition and equipment of the troops being sent to Bemus III. He found that the equipment had been brought almost back to normal. But the combat group was depleted in both men and officers, and somehow looked none too good to him. Finding nothing specific that was wrong, he attributed it all to the recent ordeal on Inferno, wished the men luck, and went back to the problem of Bemus III.

Five days later, the one significant change in the situation was that the reloading of Wilforce's ships was complete. His main fleet now blasted off for Bemus III. En route, Wilforce wrestled with the conflicting data, but it still proved impossible to fit it into any sensible pattern.

The trip to Bemus III was expected to take about sixteen days. Before they had been gone one full day, the destroyer on the planet stopped transmitting reports, and could no longer be reached.

When the fleet was still better than five days out from the planet, the commander of the fast task force sent ahead of the fleet reported back to Wilforce by communicator.

"Sir," said the officer, frowning, "we've just completed our first sweep through Bemus System. If there's anything out of the ordinary here, we haven't seen it. The one thing I don't like is this big belt of asteroids between the third and fourth planets."

Wilforce nodded. An asteroid belt could confuse the detectors and incidentally conceal whole squadrons of hostile ships. Wilforce said, "When do you intend to land the Pioneers?"

"In about four hours, sir. They're coming through right now. We expect to keep the troops close by, but offplanet unless the Pioneers run into trouble."

"Good," said Wilforce. "Have the Pioneers report to me as soon as they find out what happened to that destroyer."

"Yes, sir."

Wilforce spread out several big charts of Bemus System. Later that day, he was rechecking his plans for approaching it, when Rybalko came over, his face pale.

"Sir, the Pioneers have found the destroyer and boarded it. We have them on the screen."

Wilforce put down the chart and went over to the screen, where a man wearing the customary fringed leather shirt of the Pioneers knelt beside a

long low shape covered with a rough gray blanket. As Wilforce came over, the Pioneer pulled back the blanket.

Underneath, stretched full length on the metal deck, lay a bare human skeleton.

Wilforce drew his breath in slowly. He noted the thin steel chain that looped loosely around the vertebrae of the neck to hold the dull metal tags. He saw, flat on the floor nearby, a shiny cleaver, the plastic inserts in its handle missing.

The Pioneer glanced at Wilforce. Wilforce nodded, and the Pioneer pulled the blanket back over the skeleton. He said, "We've found eight more of these in just one section of the ship. That's all we've found of them. Outside, there's only tracks. Mr. Pick said he wants to have a better idea what happened before he gets in touch with you. But he'll call you in three hours at the latest. Is that all right?"

Wilforce thought a moment. Pick was head of the Pioneers attached to Wilforce's command, and he generally worked best when given plenty of freedom. Wilforce said, "Does Pick need reinforcements?"

"Not right now. He doesn't want them."

"All right.'

The screen blanked, and Wilforce glanced at Rybalko. "After we break out of subspace, I want one squadron located to smash anything that raises its nose in the densest part of that asteroid belt. I also want selected sections of the belt saturated with reconnaissance torpedoes. You might have the data run through the computer now, and we can see what the best pattern seems to be."

Rybalko said, "Yes, sir. Sir, did you notice that cleaver?"

"I noticed the handle. But we won't really know much till we talk to Pick."

Jeremy Pick was on the screen a little over three hours later. He was a tall man with a high-bridged nose and light gray eyes that shifted warily as he talked. He said, "General, I don't know exactly how to describe this place. It's too quiet. And for some reason we feel even more uneasy inside the ship than out."

Wilforce said, "You didn't find any survivors in that destroyer?"

"Not a one. We've found nine skeletons, and that's all. Outside, there's scattered weapons and equipment. Apparently, the men were overrun in a rush before they had a chance to act."

"Overrun by *what?*"

"To judge by the tracks, by carnivores measuring around twelve feet between the fore and hind limbs, and weighing up to thirty-five hundred pounds."

"Have you seen any of these animals?"

"No. We've seen some herbivores that aren't mentioned in the survey reports; but they might be the young of these 'croppers.' We haven't seen a single carnivore of any size yet."

Wilforce scowled. "Is there any place they could hide? Or could the carnivores be nocturnal animals?"

Pick shrugged. "It isn't dark here yet, so I don't know. Maybe they'll emerge from somewhere. But I've had clouds of small reconnaissance probes buzzing all over this section of the planet since we landed. If there's any carnivore that big around, it's either invisible, or else it's hugging the mud on a river bottom."

"Do you have any idea how the destroyer came to be taken by surprise?"

"Well, they had one of the big gravitors partly spread out outside, so I suppose they were spreading the parts out in the sun to dry. We checked and found where a section of coolant line had burst in the gravitor, so that much makes sense. Other crewmen were relining the ship's drive tubes. Some of the maintenance hatches were open in the aft section of the ship, along with the loading hatch, so it must have been easy for anything to get in. As nearly as we can figure out from the remains of the log, they had scoured this section of the planet, found nothing dangerous, and weren't worried."

Wilforce said, "You say, '*remains* of the log'?"

"The log is partly eaten up, as if by mice."

"Have you *seen* any mice?"

"None. And we haven't found any droppings."

Wilforce said exasperatedly, "That's a peculiar planet, Pick."

"It's peculiar, all right. The more we find out, the less sense it makes."

"If those giant carnivores can show up by surprise once, they may do it again. Are the hatches shut now?"

"The hatches are dogged tight. No one goes in or out except through the air lock. I've got half-a-dozen Bats cruising around outside waiting for any carnivore to so much as raise its snout. All the same, I don't exactly feel at home in this place."

Wilforce thought a moment. "Listen, why not move one of the communicators into some part of the ship where we can watch what you're doing, and then leave it on. If anything happens unexpectedly, we'll know about it."

Pick said, "Good idea." They talked a little longer, then went back to work.

While still about a day out from the planet, Wilforce was in the flagship's command center studying the computer's suggested deployment. A call from the task force commander was relayed to him, and the man appeared on the screen with a look of alarm and uncertainty. "Sir, we've got something here, but I don't know what."

"What do you mean?'

"About fifteen minutes ago, our detectors picked up an object roughly the size of a destroyer. We were standing by off Bemus III, and the object passed between us and the planet, moving at about two miles a second. It stayed on the detectors a little under three seconds, and then it vanished. We can't locate it. There

was no sign of it before, and there's been no sign of it since. But we've checked, and the detectors of every ship in a position to pick it up *did* pick it up."

Wilforce looked away a moment, then said, "How far from the planet was this object?"

"About twenty thousand miles, sir. It was moving as if it was in orbit."

"It *sounds* as if it's in orbit. Calculate its projected course as well as you can, and have a ship trail it. If it comes in sight again, learn all you can, but for now don't interfere with it. Just watch it."

"Yes, sir."

Wilforce had just finished this call, when Rybalko came over. "Sir, Mr. Pick was just on the screen. I didn't want to interrupt your call, so I took it myself."

"What did Pick want?"

"Reinforcements, sir. He's run into a peculiar situation. He's lost several men. One of them was carried off by a carnivore about the size of a tiger, that was apparently lying in wait in a ruined cabin. A probe was overhead, and had the carnivore in sight as it vanished in a patch of thick brush. The animal had no time to get out of the brush before other probes had it in view. Pick and a crew of Pioneers took the brush patch apart bush-by-bush. No carnivore came out. No carnivore was in there."

"You mean, this tiger went in. It didn't come out. And when they looked, it wasn't there?"

"That's what he says, sir."

Wilforce frowned. "How did Pick seem?"

"Jumpy. He had a fusion gun in his hand and kept glancing around all the time. But he sounded rational enough."

"All right. Send the combat group down to back him up. And have Pick send up reproductions of the visual records from the probes that had this in view."

"Yes, sir."

Rybalko went out. Wilforce turned to look at a large three-dimensional image of Bemus System, his planned deployment outlined on it. The computer had helped perfect the details of this deployment, but Wilforce was now thinking that the most accurately detailed plan is questionable if based on questionable information. With a vanishing ship flitting through space near the planet, and disappearing animals on the planet, how was he to make a satisfactory plan?

Bit-by-bit, allowing for large uncertainties, he began to revise the plans.

Rybalko came in when Wilforce was part way through, and stood watching the symbols on the big three-dimensional image.

Wilforce looked up, and Rybalko said, "Sir, the records of the probes watching that carnivore are starting to come in."

"Good. I'll take a look at them later, if I have time. Have Evaluation go over them and see what they think."

"Yes, sir." Rybalko hesitated, looked at the projected plan, then said,

"Did you think we should make a more gradual approach, sir?"

Wilforce nodded. "When you're locked up in a dark cellar with someone who may be an enemy, let *him* make the first big move. Of course, you can always toss out something small and see if he jumps for it when he hears the clatter."

Wilforce's fleet was normally organized in five divisions. The fast ships of one division made up the task force that had gone ahead. Wilforce now took the remaining ships of this division, plus his own center division, out of subspace toward Bemus III. Behind him in subspace lay sixty per cent of his striking force, ready to attack at a moment's notice.

In the command center's big, three-dimensional battle screen, Wilforce could now see the first stages of his deployment working out as planned.

The bright lines arcing closer to the sun Bemus showed the paths of fast transports carrying mobile racks of the disks that would be sowed in long rows, each to exude a puff of loose silvery material that

could expand at a given signal to a wide thin doughnut with a dazzling film of silver stretching across its center. And that could, at another signal, contract, turn together through specified angles, and again expand, to focus an unendurable blaze of solar energy in a selected region nearby or far away.

Wilforce watched the bright lines that marked the transports slowly separate as they raced to their separate positions. He glanced at the asteroid belt, represented in the battle screen as a stream of green-colored dots. Any abrupt change of speed or direction would cause the dots involved to turn red. So far, they remained green.

Toward the sun from the planet Bemus III, were the four pale blue spheres that represented the four sections of his diminished fleet. These spheres were grouped as at the four corners of a huge tetrahedron. From them, a spray of fine lines reached out toward the planet like the fingers of a giant fist. These were the advance scouts, that would scour the planet from pole to pole, to provide a picture in which Wilforce hoped to find some pattern that would give a clue to past events.

As the transports approached their final positions, and as the scouts let loose their clouds of probes, Wilforce waited, tensely alert.

The ideal time for an enemy to strike slid past.

Nothing happened.

The transports reached their positions, and sowed the racks that sowed the disks. The solar beam was ready.

The scouts sent back a flood of aerial photographs and data, for Evaluation to fit together into a coherent picture of Bemus III.

Still nothing happened.

Wilforce looked at Rybalko.

Rybalko looked blank.

Time passed. And still nothing happened.

Wilforce thought over his dispositions. Sixty per cent of his fleet was like a hidden club, which he could bring out at any time. The other forty per cent, himself included, acted as bait. The probabilities seemed to show that *something* wished to remove humanity from Bemus III. Therefore, if he immediately proceeded to take over Bemus III, the something should strike. If it struck, he might very well be able to strike back. If he was unable to strike back, then, at least, the extent of the danger would be uncovered. But now, *nothing* happened.

In time, Rybalko said, "Sir, first reports from Evaluation show nothing unusual on the planet, except some large herds of herbivores—apparently offspring of the big croppers.

"Herbivores. No carnivores?"

"None seen yet, sir."

Wilforce nodded. Methodically he went back over what he knew about Bemus III. All reports showed it to be a placid quiet planet, with no natural enemies of humanity on it anywhere, but all the same, the colonists had built their settlements as if they expected attack any time. And the colonists had lived there un-

molested for over ten years—then suddenly had been wiped out.

Wilforce scowled, and then considered the rest camp. Nearly all the buildings in the rest camp were light and temporary. They could no more hold off an attack than a blotter could seal out water. Obviously, no attack was feared. But on the other hand, there were those few permanent buildings in the rest camp. And these were fortified like a frontier outpost on a planet swarming with reptilian monsters. Obviously, an attack *was* feared.

Wilforce drew a deep breath, and turned his thoughts to the destroyer. Its crew felt sufficiently sure there was no enemy around to leave their ship and work outside. The Pioneers, much more capable of defending themselves on a strange planet, felt so uneasy that they were jumpy inside a locked-up destroyer that could make mincemeat of endless carnivores —granted only that the people inside were on their guard.

As if this were not trouble enough, there was the problem of the way the destroyer had arrived here in the first place. It was on the planet because of a collision with, or a blow from, some invisible object. Just such an invisible object had now momentarily come into view of the task force off Bemus III, only to vanish again. Why appear in the first place? Why vanish?

And now, Pick had lost several men despite precautions, one of them eaten by a carnivore which was plainly seen to go to a given place. When the place was examined, the final result was that the carnivore had gone in, he hadn't come out, and he wasn't there.

Wilforce swore aloud.

Rybalko looked up. "Sir?"

"Nothing," said Wilforce. He forced his attention back to that incident of the carnivore. There, at least, was something definite. Methodically, Wilforce considered the possibilities. To begin with, either the observation was correct, or there was some mistake. On any other planet, Wilforce would have thought it was a mistake. But here, it fit the pattern perfectly.

In that case, assuming Pick was right, what *could* have happened? Wilforce thought hard, and ended up with only a few possibilities that seemed reasonable. First, either the animal had merely ceased to exist, which was ridiculous, or it had not. If it had not, then it was either still in the place where the brush patch had been, or it was out of it. This led to a few possibilities that should be checked. If in the patch, it would seem that the animal must have a well-concealed burrow. If out of it, it must have gotten out by an underground burrow, or on the surface. If on the surface it must either actually have been invisible, a possibility Wilforce did not enjoy thinking about, or it must have very effective protective coloration.

Wilforce sat down at a communi-

cator, and called Evaluation. A weary-looking captain appeared.

Wilforce said, "Captain, do you have some films from Mr. Pick's probes showing a carnivore that attacked one of the Pioneers, then disappeared in some brush?"

"Yes, sir," said the captain. "We've been over that sequence till we can't see straight."

"Can you summarize it for me?"

"Yes, sir. The Pioneer was examining tracks outside the cabin, which was badly smashed up. Several other Pioneers were nearby with guns keeping an eye on things in general. A large, somewhat tigerlike carnivore came out of the cabin in one blur, knocked the Pioneer flat, seized him in its jaws, and sprang behind another cabin. He was behind the cabin before the men could fire. There was a gravsled nearby, and they jumped into it, but the carnivore had already bounded to a patch of tall, widespread, thickly branched brush. There was a Bat overhead that they could have used to kill the carnivore, but that would have blown the man to bits as well as the carnivore. Well, sir, by this time the carnivore could have been in any of a number of places in that brush. There was thick foliage overhead, but ample room to move around underneath."

"Then what happened?"

"A probe had been overhead to catch all this. It was immediately shifted to cover more of the brush, and other probes were quickly switched in to cover the rest. This all happened very fast."

"Could the animal possibly have gotten out before the coverage was complete?"

The captain shook his head. "Sir, I don't think so. You see, those probes were nearby. All the brush being observed right then, but there *was* a complete ring of territory around the brush that was covered. The probes were moved in in such a way that this ring of observation was never broken. It was merely contracted till it included the brush. For the carnivore to have gotten out of the brush, it would have had to move very fast, and it would still have had to cross space that was under observation. It didn't."

Wilforce nodded slowly. "What happened next?"

"Mr. Pick and a small army of Pioneers methodically hacked the brush apart piece-by-piece. They worked shifts, using floodlights and flares to keep the place lit all night long. There was no time it was really dark in there. Finally, they had the whole thing taken apart, and there was no carnivore."

"Did they find *anything* in there?"

"Yes, sir, they drove out quite a number of small animals, a herd of pretty big herbivores, and a flock of birds. You see, the brush patch was made up of tall bushes that grow large edible berries, so the animals were attracted to it. But the carnivore wasn't in there."

Wilforce was silent a moment. "You checked this a number of times?"

"Yes, sir."

"What chance is there the animal could have crawled into some crevice or concealed burrow in that patch of brush?"

"We thought that must have been what happened, sir, but since then the Pioneers have gone over every square foot of ground, and they haven't uncovered a thing."

Wilforce thought this over. Then he nodded. "Thank you, captain."

"You're welcome, sir."

Wilforce next decided to call Pick. A jumpy-looking Pioneer appeared, to say, "General, he's down in the food storeroom right now, and he's mad as a Martian rat in a rainstorm. I'll try to get him if you want, but you can't expect much."

Wilforce laughed. "Go ahead. I'll take my chances."

The Pioneer turned away. There was a mutter of voices. Wilforce even overheard the word "sir" once or twice, and he knew the Pioneers were constitutionally indisposed to use that word. Several minutes passed, and the Pioneer reappeared on the screen, red-faced and mopping his brow. "He'll be right up."

Pick came on the screen tight-lipped and silent, with an expression around the eyes like a panther with its tail in a trap. He glared at Wilforce and said, "Do you have something called a stalker's helmet?"

"Special Equipments probably has some. Why?"

Pick drew a deep breath, and seemed to struggle to calm himself. "We've got some kind of small rat in the food stocks. We don't see it. We don't hear it. It leaves no droppings. But it eats. We want to see it in action, if possible. It also occurs to me we might need something like this 'stalker's helmet' I've heard of. It's supposed to be a new item of Space-Force emergency equipment, isn't it?"

"Yes, but I don't know anything more about it. How many do you want?"

"Three should do it."

"O.K. Now, about that carnivore you spotted, and that ran into the brush—"

Pick shook his head. "It went in. It didn't come out. And it wasn't there afterward. That's all I can say. We've found no sign of a burrow whatever. We've been over those films till we're black in the face. Maybe by some form of clever camouflage the animal could have slipped away without our seeing it *at the time*. But we'd spot it when we checked over the films afterwards. So that isn't it, either. We've examined those films inch-by-inch, and what happened I don't know, but no visible carnivore came out of that brush, and that is all I can say."

Wilforce said, "Well, that leads us nowhere."

"So," said Pick, "I am going to concentrate on the vermin on board this ship. If I can get a grip *anywhere* on this mess, maybe I can straighten it out. So far, I feel like a man trying to swim in empty space."

Wilforce nodded sympathetically,

then suddenly got an idea. He glanced around and saw Rybalko coming across the room from a group of staff officers. Wilforce said, "Balky, does the 186th still have its mascot?"

"Yes, sir. I'm sure of it."

Wilforce turned back to the screen. "Pick, I think I know where you can get just what you want—a full-time expert on rats, with endless patience, great stalking ability, and extrasensitive vision."

"Where's that?"

"Get in touch with the C.O. of the 186th Combat Group. If you explain your predicament, and promise to take good care of him, the 186th *might* let you borrow their mascot."

Pick frowned. "*What* mascot?"

"A big, ugly, tiger-striped gray tomcat. For your own sake, be careful how you handle him. He's a little rough."

Pick's eyes glinted. "That's the best idea yet. Do you have anything else you want to ask me?"

"No."

"O.K. Get off the screen so I can call the 186th."

Wilforce punched several buttons to the side of the screen. A second lieutenant appeared.

"Sir, Special Equipments."

"Do you have any stalker's helmets around?"

"Stalker's helmets? Just a moment, sir." He turned and called out. An answering call came back. The lieutenant turned around. "Major Barnes will be here in just a minute, sir."

A medium-sized man with major's leaves appeared. Apologetically, he explained that stalker's helmets were new items of equipment that weighed thirty-two pounds apiece, and were just a little clumsy. "They haven't got all the bugs out yet, sir."

The major turned to bark orders at the lieutenant, who vanished and reappeared with a thing like a dull-gray inverted fishbowl with a set of eyepieces sticking out in front, in back, on both sides, and on top. Wilforce was reminded of the high-pressure spheres in which Planet Certification lowered its men to the ocean depths.

"You see, sir," said the major, "the idea is that when a man moves, he's seen. But he *has* to move to see what's going on around him. So this helmet is rigged up in such a way that by a very slight inclination or rotation of the head, the lines of vision of the man wearing it can be switched through lenses and prisms to any one of these sets of eyepieces. In theory, he can see what's in any chosen direction. In practise, after a man has carried this weight around on his head for any length of time, he finds it hard *not* to move his head slightly. The result is, he sees alternately right, left, forward, back, and out the top of his head. Trying to walk in one of these is like a madman's nightmare."

The major paused, and added apologetically, "If you still want one of these, sir, we've got them. But I'd wait till the improved model comes out."

"I see your point. Well, write a

brief note explaining the shortcomings of these things, and how they're supposed to operate, and send three of the helmets down to Mr. Pick."

"Yes, sir."

Wilforce turned away as he finished the call, to glance at the battle screen. Nothing significant appeared to have happened, and as he paused to review the situation and decide what to do next, the red warning light on the communicator beside him flashed on.

Wilforce snapped on the communicator. A neat officer with a look of intense self-discipline, wearing two stars on each shoulder, saluted stiffly. This was General Davis, Wilforce's Combined Forces Commander. In a full-scale planetary war, Davis would control the combat forces actually on the planet. But right now, there was only a single combat group on Bemus III. Puzzled, Wilforce returned the salute.

Davis said, "Sir, I have to report a case of gross dereliction to duty, regarding the commanding officer of the Forty-second Combat Group on Bemus III."

"What's happened?"

"Sir, the purpose of landing the Forty-second on the planet was to enable us to very quickly send help to Mr. Pick, if he needed it. To be able to do this, the major commanding the combat group should hold his forces mobile and ready to act at a moment's notice. This hasn't been done."

Wilforce frowned, and Davis went on. "His troops are digging themselves in. Instead of being heavily armed, the charges for their fusion guns are locked up inside one of the communications buildings. The prox-ex and impax ammunition are locked up in another building, so the men have nothing but ordinary target rounds. The grav-carriers are stacked in the communications compound, along with most of the rocket launchers. Specially-selected, heavily-armed troops that the major feels he can trust man the walls around the communications center, where he has his headquarters."

Wilforce seemed to feel his collar grow tight. " 'Troops the major feels he can trust'?"

"Yes, sir,"

"Go on."

"Sir, that's it. The major has his nest in the communications center. Selected guards man the wall to protect him from his own troops. The bulk of these troops are armed after the style of 1912. They dig their foxholes and trenches by hand, and have to hunt for food in the forest nearby.

An unlovely combination of words rose to the surface of Wilforce's mind. With an effort, he kept his voice level as he asked, "It's like this right now?"

"Yes, sir. It will be at least an hour-and-a-half before I have it straightened out.'

"I see. How did you find this out?"

"I saw the unfinished trenches on a high-level photo from one of the

scout ships. It seemed to me they could have had those finished long ago. I shifted focus on the viewer, and discovered they weren't using a trencher. They were doing it by hand. I snapped on the screen to get the Forty-second's commanding officer, but a medical officer appeared and told me the C.O. was suffering from nervous strain, and I couldn't talk to him."

Wilforce loosened his collar.

Davis said, "It took me very nearly five minutes to break through this asinine situation, and get the major on the screen. The major was dead drunk. The medical officer now intruded to inform me that this was 'therapy.' It appears that the major is suffering from a chronic state of anxiety, which is relieved by the situation down there as it now exists. Unless we handle him with padded tongs, we are likely to upset his emotional balance."

"You say it will take *an hour-and-a-half* to get him out of there?"

"Yes, sir. I'm sorry. I have near the planet a colonel of Scouts who's had a good deal of experience with troops, but it will take that long to get him on the spot."

"That's too long. All hell may break loose down there any time."

"Sir, in the rat's nest atmosphere of the Forty-second's headquarters, I can't find anyone qualified to command. And we can't risk having it bungled."

"That may be, but it won't do. An hour from now, the Forty-second may have suffered fifty per cent casualties from a few monsters that one properly handled fusion gun could chop into hash. Not only is it bad in itself, but it makes a story that will be told for the next fifty years. A thing like that can spread cynicism and rot through the service like a virus spreads disease."

"Yes, sir. But—"

"Wait a minute." Wilforce thought back to his quick inspection of the Forty-second's equipment just before they left the Space Center for Bemus III. He thought he remembered something. He said, "Find out if they have a full-range battle transceiver down there."

"Sir, we used almost all of them on Inferno, and the Center didn't have any new stocks."

"Check and find out."

"Yes, sir."

Wilforce glanced around, to see that nothing of any importance seemed to have happened. He frowned, thinking back to the appearance of the Forty-second at the Center, and wondering why he hadn't noticed anything. There *had* been something —a general washed-out spiritless look in the troops, and a sort of nervous overcordiality in the commanding officer—but Wilforce had attributed it to the long misery on Inferno, and the wild binge to celebrate getting off Inferno, followed by the news that they were being sent to some new mess that wasn't even in their own sector. Wilforce glanced back at the screen, where Davis reappeared with a surprised look.

"Sir, they *do* have a battle transceiver."

"Good. Have them set it up on some rise of ground between the communications center's outer wall and the trenches."

"Yes, sir."

Wilforce turned to Rybalko, and told him what he was going to do. He added, "If we have any trouble back here, I'll want to know immediately. Have a competent officer in a monitor booth ready to take over the transceiver."

"Yes, sir."

Wilforce glanced at the communicator, where Davis returned to say, "Sir, they're setting it up."

Wilforce said, "Good," and walked swiftly to one of several blocks of thick-walled booths that stood at an angle to the rear wall of the command center. He stepped into one, and shut a thick door behind him.

Directly in front of him appeared a sweep of slightly-rolling ground cut by trenches where men dug slowly with picks and spades. About five hundred feet away was the forest. To right and left, the forest stretched further away. Wilforce turned, to see behind him a faint line outlining the door of the battle transceiver booth, and, beyond that, a high wall of thick upright logs.

A little distance away, holding their fusion rifles at the ready, were two burly privates. A sergeant stooped to check the dials of a brown box near a power cable that ran back across a ditch and over the wall into the communications center. For an instant, Wilforce felt his usual sense of disorientation, and reminded himself that this was nothing more than the ordinary two-way communicator screen carried a step farther. The booth he was in had its circuitry within its walls, and its multiple screens curved and joined over the inside surface of the booth. The battle transceiver, on the planet, had its circuitry inside, and its screens shaped and joined on its outside surface. The effect was that the commander using the battle transceiver saw things as if he were on the planet, and he was seen by those on the planet as if he were actually there. The defect was that the bulky transceiver on the planet was awkward to move, and constantly in danger from every chance bullet and

shell fragment that came its way.

As Wilforce watched, the sergeant made a final adjustment at his box, and abruptly there was sound. The dull clink and scrape of pick and spade reached Wilforce clearly. A voice carried to him from the trenches:

"Hey, the general's ghosting us!"

Wilforce glanced up briefly, and pulled down a small microphone on a slender stalk. "Sergeant," he said, and his voice carried clearly.

The sergeant snapped to attention and saluted.

Wilforce returned the salute and heard the sound of digging slow, as men paused to listen. He said, "Why are these men digging by hand? Is the trencher out of order?"

"No, sir."

"Are all these men being disciplined?" Wilforce's tone was cold.

"No, sir."

"Then why are they digging those trenches?"

"Major's orders, sir."

A dead stillness settled over the clearing.

Wilforce said, "I want those picks and spades put away immediately. Tell the major I want to see that trencher at work out here inside of five minutes. I also want the major and his company commanders to report to me as fast as they can get here."

"Yes, sir." The sergeant stepped back and saluted.

Wilforce returned the salute.

The sergeant faced about and set off at a run. Wilforce watched him scramble down into the ditch around the jutting log walls, climb a ladder

against the walls, and pause to salute a lieutenant. There was a brief exchange of words. The lieutenant cast one glance toward Wilforce, and joined the sergeant in a headlong rush toward the inner wall. An instant later, there was the sound of shouted orders, the clank of an engine, and the crash of heavy objects being moved.

The long low trencher rose up behind the wall, a big, roughly ski-shaped grav-carrier supporting it, with three other carriers crosswise to brace the front. At the prow of each carrier bent a sweating technician, while atop the trencher stood the lieutenant, his face pale as he glanced nervously along the line of grav-carriers, and back up over his shoulder at the looming tower. He called out a series of sharp orders to the technician in each carrier, then his voice rose to a scream as one carrier started to sink lower than the rest. Then, heavily, carriers and trencher moved out over the walls, and eased down outside. The trencher trundled off the carriers with a low clank and rumble, then wheeled toward a trench where the men had just stopped digging. The trencher's center section swung down into the earth, and a steadily increasing stream of dirt poured out the discharge to the side.

Wilforce glanced back at the walls to see a number of officers, very neatly dressed, scramble down the ladder, hesitate at the ditch, then plunge down in and an instant later reappear, several of them reaching out to steady one who stumbled and nearly fell.

As they approached, Wilforce saw that the man who had nearly fallen was the combat group's commanding officer, his face puffy, and his expression blank and hopeless. The officers came to a straggling halt, and saluted.

Wilforce returned the salute, and said, "Major, I have heard that most of these troops are without proper ammunition or charges for their fusion weapons. Is that true?"

There was a distinct lapse of time, then Wilforce saw a faint glimmer in the major's eyes. He started to speak.

Before he could get the words out, a pudgy captain, wearing the bright emblem of the Medical Corps, stepped forward.

"General, this man is ill. As a physician, I must forbid—"

Wilforce glanced at the captain, as a soldier looks at a blood-sucking bug in the bedding just before he squashes it.

The captain hurriedly stepped back out of the way, his teeth clicking together.

The major drew a deep breath, and said shakily, "Sir, it's true."

"I see," said Wilforce, and the silence quickly deepened around him till there was only the rumble of the trencher and the faint rustle of the forest around them. This silence told Wilforce that every man who could was watching, and because of the carnivores in the nearby forest, this

situation was dangerous. Wilforce chose his words with care, and spoke so that his voice would carry clearly.

"Major, there are large and dangerous animals in that forest. No doubt the men can hit them with the ammunition they have now. But they can hit them a lot harder with the proper ammunition. I want prox-ex, impax, and fusion charges issued immediately.

As the major said, "Yes, sir," Wilforce could see the faces of the men turn to glance uneasily toward the forest. This much he had expected. But this was followed immediately by a shout, the glint of a rifle swinging up, and a spatter of gunfire.

Wilforce glanced around to see a brownish form blur across the clearing, then rise in a bound that showed huge forepaws and teeth like bayonets. The fire of machine guns, and of rifles firing almost point-blank, had no effect on the creature that Wilforce could see. A quick glance toward the communications center wall showed him men with fusion rifles looking on in a sort of trance.

Wilforce brought the microphone to his lips and spoke loud and clearly, "You on the walls, there—burn that thing down!"

Belatedly, the fusion rifles swung up. In the trenches, the men ducked as the carnivore sprang overhead, whirled, crouched, and reached in with its huge paw like a bear scooping fish from a stream. There was an audible snap and crunch of breaking bones, and the huge throat muscles worked under the fur.

Then finally, the dazzling lines of light reached out from the wall. There was a sizzling crack like a thunderbolt striking close at hand. The carnivore jerked, twisted around to claw at its middle, where a dark and widening pool flowed into the earth. Then a searing line of light touched the huge head, there was a spasmodic jerk of paws, and then all that was left was a steaming carcass.

Someone shouted from the far side of the wall, facing the opposite end of the clearing.

Wilforce turned to see the major and his officers standing as if they had been frozen into blocks of ice. He said sharply, "Major, get that ammunition and those fusion charges passed out, *and hurry up!*"

The major blinked, then suddenly seemed to come to life. He gave rapid orders to his officers, glanced at Wilforce as if he wanted to say something, shook his head slightly, saluted, and set off at an unsteady run for the communications center. A few moments later, the trencher ate its way from the inner line of trenches toward the wall. Men began passing ammunition cans down the ladder to other men in the trench.

Just then, a voice spoke to Wilforce, and it took him an instant to realize that it was Rybalko, saying, "Sir, excuse me—that vanishing ship has been spotted again."

Wilforce slid the microphone up, pressed back the door edge, and step-

ped out of the transceiver booth, feeling again a momentary disorientation as he glanced around the command center. Then he saw the big viewscreen on the far wall, the planet Bemus III in its lower left corner, and in the center a silvery object like a chopped-off length of giant rod. Wilforce crossed the room to take a closer look.

He studied the big flat-ended object for a moment, noted the pitted look of its surface, and saw what appeared to be a small hatch housing at its far end.

Rybalko said, "Sir, this thing is in orbit around the planet. We've only been watching it for several minutes now, but it vanished twice."

Wilforce, trying to see if what he saw near the far end *was* a hatch housing, abruptly found himself looking through empty space at a distant constellation. The huge closed cylinder was gone.

Rybalko had a watch in his hand. When the cylinder reappeared, with the abruptness of a projected image thrown on a screen, Rybalko glanced at the watch. "Eight seconds. There doesn't seem to be any pattern."

Wilforce said, *"All* our instruments show this object?"

"Yes, sir. And its orbit seems perfectly sensible. But all it seems to do is to vanish and reappear. There's been no actual sign of life from it so far."

Wilforce nodded. For a moment, he tried to connect the disappearing ship with the disappearing animals on the planet. But there occurred to him such a host of unlikely theories that he decided to forget all about it. He glanced at Rybalko.

"Both ends of that cylinder are closed?"

"Yes, sir. There are signs of possible openings, but they're shut now."

Wilforce glanced at the cylinder again. Its blocky shape suggested to him that it was probably not intended for use in a planet's atmosphere. It might be—perhaps—an interplanetary cargo carrier. The apparent invisibility of the ship might be due to extremely well-designed counterdetection apparatus. Assuming it had, for some unknown reason, been left in orbit around this planet, it could have remained there for thousands of years with little noticeable change. And the destroyer that crash-landed on Bemus III had collided with something. It seemed reasonable to think it had collided with this cylinder, had heavily jarred the counterdetection apparatus, and caused a malfunction that produced the alternating visibility and invisibility.

Wilforce turned to Rybalko, and said, "We'll have to see if that thing can be boarded. It's just possible that this might be the loose end of the knot."

Rybalko turned to the communicator to repeat the boarding order to the task force commander.

As Wilforce again turned to glance at the unchanging battle screen, a call came in from Pick.

"Here's something queer," said Pick. "Some of my men have been

finishing up a check of the settlements. They've found a few partly-chewed scraps of clothing, paper, and so on, plus droppings containing metal snap fasteners, identification tags, and other metal items, which pretty well bolster the theory that the carnivores attacked and actually ate the colonists, and the herbivores ate the food stocks and records. But some of the metal identification tags, chains, and other items were in *unburied* droppings, exactly typical of the Bemus herbivores we've seen so far."

"The colonists could have taken off their tags and left them in the pockets of their clothing."

"Would they have taken out their dental fillings and put *them* in their pockets?"

Wilforce stared, then said slowly, "Dogs don't bury their droppings. They're carnivores."

"True, but everything we've found so far suggests catlike forms that lie in wait, not doglike animals that run down their prey. And it's important to a catlike animal to keep the herbivores in the vicinity unaware that it's there. This business strikes me as very peculiar, and it's not the *only* peculiar thing."

"What else?"

"All the settlements have big barbecue pits. Now we find from the remains of weeds buried under the dirt from these pits, from the size of weeds growing atop the dirt, from the ashes in the pits, and from the condition of the pit's big stakes, that they were dug recently and only used once—around the time the attack was made on the settlements."

Wilforce went to bed still turning this problem over in his mind. Early the next morning, he came wide awake, and, for an instant, everything fitted together in a complete picture.

Wilforce swung to a sitting position on the edge of his cot. Already, the thoughts were slipping away, and carefully he held his mind nearly blank, trying to grope back along the mental associations to the pattern of ideas that had been in his mind the instant before he came fully awake. Gradually, it all came back to him, and he saw the puzzle on Bemus III fit together like the steel hooks, jaws and springs of a powerful trap.

Wilforce went over his thoughts a bit at a time, carefully checking each connection, till he was sure it fitted together in a consistent whole. Now he wondered how he could ever have missed it. He washed, dressed quickly, and started down the corridor to the command center. He turned a corner and a junior communications officer came out a door and said, "Sir, excuse me, could you come in here a minute?"

"What is it?"

"It's the screen the Pioneers set up so we could watch the destroyer, sir. We've got something funny here."

Wilforce said, "All right. Let's see it."

The communications officer quickly led the way into a darkened room, where a technician sat hunched at a screen. Wilforce looked over his

shoulder to see a dim corridor in the crash-landed destroyer. In the foreground was an air-circulation duct. As Wilforce leaned closer, he saw a faint movement, then a small shadowy thing that squeezed under a corner of the mesh over the duct opening and dropped to the floor. There was a swift scurry down the corridor, then another small thing moved in a long bound. There was a brief struggle, then silence, and finally a faint crunch. Another shadow slid out the duct.

Wilforce said, "How long has this been going on?"

"Ever since they carried that big tomcat around the corner into the food storeroom. These things have been popping out the ventilator right and left."

"I see." Wilforce turned to the communications officer. "Get Mr. Pick for me on another screen, and hurry."

"Yes, sir."

The officer went out, and Wilforce turned to glance at the screen. On it, nothing moved. The corridor appeared to be empty. He said to the technician, "We aren't transmitting sound, are we?"

"No, sir."

"Have you seen any other animals beside these small ones?"

"Sir, I could have sworn something the size of a rat went by the other night. But it was moving fast, and I haven't seen anything like it since."

"Did it come out of that ventilator?"

"No, sir. It streaked down the corridor well over to the side."

The door opened. "Sir, we'll have Mr. Pick in just a moment."

Wilforce said, "Switch the call to the command center. I'll want General Rybalko to see it, if possible."

"Yes, sir."

Wilforce went to the command center, observed that the battle screen continued to show nothing of interest, and then saw the big wall screen, lit to show the huge cylinder, now surrounded by small spaceboats. There was a round opening in the far end of the cylinder where Wilforce thought he had seen a hatch. He looked at the cylinder with a frown, then glanced around as a communicator switched on. Pick was on the screen, tired and scowling.

Wilforce described what he'd just seen.

Pick said, "Just a minute. I'll find out whether that cat's caught anything."

Wilforce snapped on another communicator, and called Davis, who appeared on the screen rumpled but alert. Wilforce said, "Has the Forty-second had any more trouble?"

"Nothing serious, sir. Every now and then, something charges out of the forest and gets cut to pieces before it can do anything. The only trouble is rats and hallucinations."

"Rats?"

"Yes, sir. A kind of furtive vicious rat has turned up that feeds on the remains of the carnivores and any other flesh it can sink its teeth in. There have also been reports of

things something like hyenas, but there are a lot more of these rats."

"What was that about hallucinations?"

"The nervous strain down there must be pretty severe. The men are probably in no real danger now, but the thought of those monsters springing out of the forest any moment, and the constant watch that has to be kept— Well, some of the men think they've seen chunks of carnivores they've shot get up and walk away."

"You have your colonel of Scouts in charge?"

"Yes, sir."

"Did you get that medical officer out of there?"

"Yes, sir. Incidentally, sir, he cracked up. He tried to shoot himself, and bungled the job."

Wilforce said, "Get a transport into position. I may want to take the Forty-second off that planet entirely."

"Yes, sir."

Wilforce blanked the screen and turned to see Pick on the other screen, a deep scowl on his face. Pick said, "That tomcat has eaten, all right. He's filled out like a barrel. He's in there dozing, and purring like a gasoline engine. There are half a dozen tails spread out around him, and the rear half of something like a cross between a rat and a weasel."

Wilforce said, "Get that half a rat, or whatever it is, and watch it. See that it doesn't get away."

Pick looked blank. "It's *dead*. How's it going to get away?"

"Never mind that. *Watch* it."

Pick's face screwed up in thought. He nodded. "All right. We'll watch it."

"Do you expect to need any help from the Forty-second?"

Pick shook his head. "I don't think we'll need any help. The simple fact is something made us jumpy. We're *still* jumpy. But now we're used to it."

Wilforce nodded in understanding. "Suppose for the time being you keep your men under cover, and use the probes to scout and observe."

"All right," said Pick. "Have you figured out what's going on here?"

"I'm not absolutely sure," said Wilforce. "But it seems to me we've got one foot in the biggest biological trap ever constructed. Now, I've got to see if this is true, and if so, how we can smash the trap." After this call, Wilforce got Rybalko.

"Sir?" said Rybalko.

"Balky, I want three subnuclear triggers checked out. I don't think we'll have to use them, but I want them ready. And have the reflectors ready to focus on Bemus III, so that at a given word, we can roast the planet."

"Yes, sir," said Rybalko.

Wilforce called Davis to take the Forty-second Combat Group off the planet. Then he had his flagship's communications center get the nearest headquarters of the Planet Certification Authority, which had made the original survey of Bemus III. He asked a single pointed question, and after a considerable delay, he received the answer: "General, there have

been no restrictions on travel to Bemus III since the planet was certified for colonization."

Wilforce got the task force commander, and asked, "What have you found out about that cylinder?"

"Sir, as nearly as we can tell, it's nothing but an extremely heavy protective housing. Inside it, there's a missile armed with what we're pretty sure is a subnuclear trigger. Evidently someone wanted to be able on short notice to turn that planet into a brilliant star."

"How is the missile released from the cylinder?"

"The ends of the cylinder are hinged to swing open like double doors, sir."

"What causes the missile to be launched?"

"So far, sir, we don't know."

"All right. There may be more of these missiles in undetectable housings. If so, we want to know about them. Check the most likely simple orbits, on the assumption that a number of missiles were used in case one failed."

"Yes, sir."

Wilforce turned to see Rybalko talking to a tall, tense-looking man Wilforce recognized as Dr. Traeger, his chief medical officer. Traeger was speaking insistently, and Rybalko was frowning. Wilforce walked over.

"What is it, Traeger?"

"General, Evaluation has been trying to decide whether the smaller herbivores on Bemus III are offspring of the big, mammothlike croppers that Planet Certification thought were becoming extinct."

"Yes?"

"Well, several of my colleagues and I tried to dissect a medium-sized herbivore, to see how similar the internal structure was to the cropper Planet Certification reported dissecting."

"What did you find out?"

"General, we had a trying time. The exposed tissues exuded white droplets. These cohered to form a tough membrane through which we could see absolutely nothing. We cut off a number of large blocks of muscle tissue to study this process. Nearly every block was quickly covered with a tough membrane. We examined the blocks at intervals and found that the enclosed tissues became soft and viscous. Layers of large hollow cells built up behind the membrane, and the internal temperature rose sharply. A reorganization of the substance of the tissues began to take place."

"To form what?"

Traeger drew a deep breath, looked directly at Wilforce and said unhappily, "To form the outlines of a small carnivore."

"An embryo?"

"No, not an embryo. I don't know how to explain it except to say that it reminded me of the precipitate that forms when a photographic plate is exposed. No doubt the mechanism is completely different, but that is what it *looked* like."

"This happened in blocks of *muscle* tissue?"

"Yes, sir."

"How would the animal find enough of the right chemical substances to form its teeth, bone structure, brain, and so on?"

Traeger shook his head. "General, I don't think it *would* find enough. But the report on Planet Certification's original dissection mentions a chain of complex nerve cells of unknown function, paralleling the main skeletal framework. At intervals, there were large ganglia, again with no known function. If we had cut through the entire limb, instead of merely taking blocks of muscle tissue, some of the blocks would have included these large ganglia as well as bone. Then the development *might* have been complete. As it was, the outlines became less distinct in the last blocks we examined. But the important point is that it happened at all."

Wilforce said, "Did the Planet Certification report mention anything like this?"

"No, sir. Nothing. It may be that the larger and older animals take longer to regenerate. Planet Certification also used the latest methods of tissue preservation, which weren't available to us."

"What happened to the animal you cut the muscle tissue from?"

"Well, by this time we'd seen what I've just mentioned, and were getting a little uneasy. We were doing the dissection in an improvised lab on one of Evaluation's scout ships. The idea was incredible, but incredible or not, we didn't care to find ourselves suddenly at close quarters with one of

those carnivores that had shown up down on Bemus III. We switched to another ship, so we could watch what happened next by communicator. We needn't have hurried. Some ten hours later, there were convulsive movements beneath the membrane that had formed under the fur and over the cut parts of the animal. The membrane ripped open, and a medium-

sized carnivore, its fur wet and clinging, climbed out, crouched, and ate the membrane."

Wilforce nodded slowly. "And in the chunks of muscle tissue, you said small incomplete *carnivores* had formed? Not herbivores, but carnivores?"

Traeger said, "We could see the beginning of claws and teeth, and the shape of the head. They were carnivores. I know how it seems, but there it is. The whole thing's impossible."

"Never mind that," said Wilforce. "If it happened, it's possible. Nature isn't bound to one single procedure. What did this large carnivore do after it ate the membrane?"

"It looked around, ate the remains of the blocks of muscle tissue, then curled up and went to sleep. After a short sleep, it woke up, sniffed the fur the membrane had formed under, tipped the communicator stand over, and that was the last we saw."

Traeger shrugged helplessly.

"All right. Now we have to find out more. What we might do now is pack the landing boat's air lock with a variety of meat, flour, paper, and other organic materials and foodstuffs, put in a time-opener for the inner air-lock door, and another communicator behind heavy mesh, and see what happens when that carnivore gets at the food."

Traeger said, "I was thinking of something like that. I'll let you know as soon as we find out anything more."

"Good."

Traeger turned to go out, and Wilforce noticed Rybalko standing nearby with a deep frown on his face. Rybalko looked at Traeger's retreating back as an officer might look at a subordinate who reported, "Sir, there's a stream in front of us, it's wide and deep and it's flowing uphill at a good clip."

Rybalko turned to Wilforce and said, "Sir, I don't quite know about Traeger. I don't exactly believe that."

Wilforce said, "Don't be too sure. Back on Earth, if I remember correctly there are things called 'oysters'—small water animals protected by two hard shells—that grow in large numbers in 'oyster beds' and are used for human food. There are also creatures called 'starfish.'

"Now," said Wilforce, "the starfish likes to eat oysters, just as people do. When the starfish finds an oyster, it grips the oyster's shell with sucking stalks on the underside of its limbs, and eventually forces the oyster's shell open. Then it squirts in a digestive fluid, and eats the oyster. Naturally, people don't care to find these starfish prowling through the oyster beds. At one time, whenever they could, they used to chop the starfish to pieces."

Rybalko nodded approvingly.

Wilforce added, "They did this until they discovered that a mere single arm of the starfish, if it included enough of the center, could regenerate *a complete new starfish.*"

Rybalko looked blank. Then he said, "This happened on *Earth?*"

"It did. Quite a while ago, too.

Our problem here has been compounded, multiplied, and raised several powers higher, so that we have what you might call a 'star tiger' to deal with. But even that is only about half of it. And we have to find an answer quickly."

During the rest of the morning, Wilforce received a number of calls. Pick, perspiring heavily, told Wilforce that the half-rat from the storeroom had grown some kind of white film, out of which had emerged a little vicious furtive thing that looked like a shrew. This thing hid under every scrap of cover, and tore a chunk out of the forefinger of a pioneer who tried to uncover it. Pick mentioned this in the defensive manner of a man who doesn't expect to be believed.

Immediately after this, Davis called, to cautiously reveal, with many roundabout expressions, that he had seen by battle transceiver a kind of big carnivore climb out through the whitish membrane around a chunk of carcass down on Bemus III. The soldiers were already so used to this that they shot the creature all over again as it emerged from the membrane. Other than this, the Forty-second had lifted from the planet without incident, but Davis was at pains to get the significance of the carnivore across to Wilforce.

No sooner was this call ended than one came in from Evaluation, and a scholarly biologist explained Traeger's information to Wilforce all over again, with many homely analogies to make it easier for the layman to understand. He dwelt heavily on the caterpillar that spins a cocoon to emerge a moth, and nothing Wilforce could do would stop him till he ran through all the details.

In a bad mood, Wilforce called back to have Davis hold the Forty-second's transport away from his other troops, and also to have the men be on the lookout for small mouse- or shrew-like creatures on the transport. Davis nodded and started explaining all over again about the carnivore coming out of the chunk of carcass. Wilforce saw little flecks dance before his eyes, and Davis hastily changed the subject.

That afternoon the task force commander called to say he had located another cylinder.

"How did you find it?"

"We figured they used three, to be reasonably sure at least one would work, and spaced them evenly about the planet. We already could make a pretty fair guess how the orbit of the one we'd found had been when the destroyer swiped it, so it seemed logical to sweep one hundred twenty degrees back with a flat pattern of reconnaissance torpedoes. This could have taken a long time, but we guessed right, and pretty soon one of the torpedoes banged into something that didn't show up on the detectors."

"Good," said Wilforce. "Tag that one, then see if you can find another."

"Yes, sir."

Wilforce blanked the screen, thinking that there might well be

half-a-dozen or more of the cylinders, but that there was no point discouraging his men by mentioning things like that.

Dr. Traeger now appeared on the screen to say, "General, we did as you suggested. We ran a sealed boarding tunnel to the scout ship, and filled the air lock with meat and other edibles and organic materials."

"What happened?"

"When the timer worked the inner lock door mechanism, the carnivore gorged on the meat, then went to sleep. We could see into the ship, and the skin and fur was gone, so evidently it had eaten that. Well, twenty minutes after gorging on the meat, it drank a great deal of water. It curled up very tightly, and its breathing became labored, as if it was struggling up a steep hill. Then the breathing gradually slowed. Three hours later the animal got up, and we could see that the form of its head, teeth, and body in general had altered to match that of the usual Bemus herbivore. It walked over to the air lock, ate up twenty-five pounds of flour, ten pounds of sugar, a ream of yellow scratch paper, a ball of twine, a uniform shirt, a pair of leather boots and a plastic ruler. Then it went back to sleep."

Wilforce nodded, and said, "Now what I want to know is, how does it all fit together? Kill a Bemus animal and it turns into one or more savage carnivores. Feed the carnivore and it becomes an herbivore. I wonder if it forms sort of scale, with the mammothlike cropper on top, and some other creature on the bottom."

Traeger said, " I should think the lower limit for this creature would be the minimum size capable of efficiently carrying the biological control mechanism that reorganizes the tissues."

Wilforce said, "I imagine Pick can help us on that. He already has one about the size of a shrew. I'll call him."

Pick was on the screen a few minutes later. Wilforce said, "Pick, do you still have that shrew?"

"We've got the thing. We aren't happy with it."

"I want you to kill it."

"It will be a pleasure. But what if it dies, and later on half-a-dozen carnivorous grasshoppers pop out?"

"That's exactly what we want to find out. We want to know just how small the thing will get."

"We'll find out for you."

The screen blanked, and Rybalko came over to say, "Sir, the Forty-second has searched its transport. A number of the men think they saw small furtive animals, but there's nothing definite."

Wilforce said, "Have them lay another transport alongside, bridge the air locks, and cross over one at a time. They'll have to strip before leaving one ship, and receive a new issue of clothing as they enter the other. Then we can pump the transport's air back into its tanks, send some men back through in spacesuits to search, and

eventually find out if there *are* any animals on board."

In the next few days, spacesuited searchers found a number of small mouse- and shrew-like animals on the transport. Now that everyone had an idea what to look for, one thing rapidly led to another.

From Traeger, Evaluation got the first solid details of the life cycle of the carnivore. With this clue to go on, they went back over a number of previous observations, and found that what they had dismissed as irrational made sense after all. Wilforce now got a flood of information that would have cleared everything up if he had gotten it sooner—but Evaluation had been afraid to give it to him because Evaluation knew it didn't make sense.

Pick called to say that the shrew was thoroughly dead, it failed to show any signs of reviving, and it was getting unpleasant to keep the thing around. Pick, therefore, buried the shrew, and Evaluation, now ready to believe anything, kept a wary eye on the grave.

Meanwhile, a sound engineer, going over a film of the animals in the corridor of Pick's ship, discovered that the furtive "mouse," when attacked, gave terrified squeals—in a pitch too high for the human ear to hear. He suggested that these just inaudible noises, repeated over and over, accounted for the uneasiness of Pick and his men, and might also be used to test for the presence of the animals.

As Wilforce and Rybalko were going over this information, the task force commander called to say that he had found two more of the huge cylinders. One contained another subnuclear trigger. The other contained the bulk of the control mechanism, designed to ignore an object that went *down* to the planet, but to send a signal that would trip off the triggers if anything tried to come *up* from the planet.

Wilforce said, "Why didn't it work?"

"Because two metal strips had to slide over one another under light pressure. Apparently, they had been there so long the atoms of the metal had interpenetrated. The strips didn't move. We've dismantled the whole thing, just in case."

"Was the mechanism purely automatic?"

"Yes, sir. But there was a manual control, too. This cylinder also had an arrangement for internal heating, plus a cot, and a desk with a little statuette."

"A statuette?"

"Apparently some kind of reminder, sir. It showed a carnivore, its sides all swollen out, with what looked like an empty pair of boots and a hat nearby."

Wilforce said, "Keep looking. There may be more of those triggers, and there should be a separate warning system around somewhere."

When this call was finished, Wilforce sat back for a moment, then had his communications center get in touch with the chief of colonization.

A strongly-built, firm-jawed man promptly appeared on the screen. He said, "I've been studying staff reports on Bemus III since Larssen sent out his alarm. Is it as bad as it seems?"

"Sir," said Wilforce, "in my opinion, it's a terrific nuisance, and a headache of the first magnitude. I don't think it should be anything worse."

The chief of colonization looked surprised, and picked up a sheet of paper. "I have here an analysis that ends up as follows: '. . . Thus small furtive Bemus creatures must already have left the planet on supply ships. They have infested an unknown number of other ships, supply centers, and almost certainly, planets. It is impossible to alter the traffic flow to prevent further infection, because we don't know where they are already. Any one of these creatures may grow larger, suffer successive "deaths," and by an unprecedented type of reproduction come to populate any planet where it is introduced. The small creatures are furtive and hard to find. The large herbivores eat immense quantities of food. The large carnivores are deadly.' "

The chief of colonization scowled. "I am no pessimist. And I don't believe in being hypnotized by difficulties. Still—are the facts I've just mentioned correct?"

"Yes, sir."

"But you think it's just a headache?"

Wilforce nodded. "It seems to me to be part of the price we pay for colonizing new star systems. If we break a trail through the jungle, some fine day, a tiger will lie in wait beside it. That doesn't mean the trail is no good. It only means that now we have to figure out how to dispose of the tiger. It's been like this since back before history began. The caveman discovers fire; that's fine—but now he gets burnt. He wants light at night, and invents the lamp; it gives light, and it also flickers and smokes up the cave. He stores food for the winter; rats get in it. A problem solved leads to one unsolved. Now we find ourselves with a big trail—and a big tiger beside it."

"But how do we dispose of this one?"

"Well, most big problems break down into a number of smaller problems. Here, we have three of these smaller problems. First—the source of the trouble—the animals on Bemus III. Second, their ability to stow away and travel on our spaceships. Third, any new colonies of the animals on other planets.

"To start with," said Wilforce, "we can ring Bemus III with subnuclear triggers, set up a warning network to keep ships away, and, if necessary, destroy the planet.

"As for travel by spaceship, it's the small, furtive animals that do this. We might not be able to ferret them out ourselves, but we can find animals to do it for us—the cat, for instance. As a check, we can put in devices to spot that high-pitched squeal the animal gives when it's caught."

The chief of colonization nodded.

"Good so far. But what do we do if it gets onto a planet?"

"That's harder. Evaluation has just tried poisons, for instance. The carnivores don't touch it, and herbivores 'die' and reconstitute themselves as carnivores. All we've seen so far shows it's not much use just to kill them. The colonists put up special barbecue pits. Evidently they killed the animals for a feast to celebrate their tenth anniversary on the planet. The captain of the crash-landed destroyer told me his men had plenty of fresh meat, so apparently they were killing them. The Forty-second had to hunt part of its food in the forest. In each case, we got misery and disaster as a result. Chance accidents, such as lightning, drowning, the fall of limbs in windstorms, were evidently enough to create an occasional monster carnivore, and keep the colonists constantly on edge when they didn't kill the things themselves. So I don't think we want to kill them."

"If we don't kill them, what *do* we do?"

"Feed them. Every time there's been an attack on the herbivores, hosts of carnivores have appeared, only to vanish by the time anyone got here to investigate. The carnivores will eat the herbivores if there's nothing else handy. They'll eat chunks of dead carnivores. They very quickly become herbivores, and *they* will eat all kinds of things. So if we have emergency food stocks ready, we can dump them in chosen areas on any infested planet, and let the creatures gorge themselves. Since they eat all kinds of things, the food stocks needn't be expensive."

"You're thinking—instead of carnivores and little scattered furtive creatures, we'll end up with placid herbivores?"

"Yes, sir."

"Then what?"

"If nothing else, we can prod them into a cargo carrier, and sling the whole works into the nearest sun. It's crude, but it ought to work."

The chief of colonization nodded absently. "Don't let the crudity of it bother you, as long as it works." He frowned. "What about those cylinders?"

"What we've seen so far indicates they're ancient. Evidently some other race ran into this problem long ago, arrived at roughly the same solution we've thought of, and has since died out, or somehow moved on. The Bemus creatures remain locked in a sort of fluid status quo."

The colonization chief was staring off at something out of the range of vision. Suddenly he snapped his fingers. "I think I see what to do. Of course, the Interstellar S.P.C.A. may let out a howl such as was never heard in all recorded history. Still—"

Some months later, the two men were on Donak IV, a frontier planet that had reported an outbreak of Bemus creatures. Moving barriers of charged wires prodded herds of the monster herbivores across a causeway to a cluster of cylindrical metal towers in the middle of a lake. There

appeared to be some sort of grim production line in progress.

From where Wilforce stood, he could see the animals go around a corner, get shot by men with fusion guns, then picked up by mechanical loaders, and dumped onto a conveyer belt which promptly carried them down out of sight.

There came a sound of rushing water, and an electrified barrier switched the flow of Bemus creatures to another tower.

Near the tower were several buildings, one bearing the sign: "TANNERY."

The chief of colonization nodded approvingly. "Very satisfactory arrangement. We stuff a load of monsters in that tower, fill it up with water, and let them evolve through whatever grisly changes they want to. It doesn't matter whether they turn into super-tigers, medium-sized carnivores, or little carnivores—they don't live without air. And that situation keeps them too busy to eat up their furs after they finish a change."

A grav-carrier lifted a load of hides from one of the towers toward the building marked "Tannery." A small hole in the side of a tower opened and spat into the lake several dozen limp mouse- and shrew-like animals, which were promptly snapped up by lean, sharp-toothed fish swimming around.

The chief of colonization glanced at Wilforce and smiled. "Well," he said, "*that* problem seems to be solved—but who knows what may happen next?"

"That's right," said Wilforce. "Man's special skill is solving problems. But the one he can't solve—is the problem of *having* problems."

THE END

IN TIMES TO COME

Poul Anderson's "High Crusade" starts off in the July issue. Poul's been doing some lovely yarns for quite some years now; they've ranged from deeply serious to magnificently nonsensical. You recall the beer-propelled interplanetary ship a year or so ago?

"The High Crusade" combines the entire range in one neatly logical, delightfully whacky, deeply serious shemozzle.

What would have happened if an extraterrestrial alien bent on conquest, with full interstellar technology, had landed on Earth back in the Middle Ages?

You wouldn't believe it until after Poul explains how perfectly logical it is that they would, of course, be hopelessly . . .

But there's no use my trying to explain. Just remember that our ancestors may have been ignorant—but they weren't stupid!

THE EDITOR.

CHARLEY de MILO

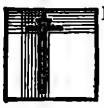
By LARRY M. HARRIS

Illustrated by Emsh

It isn't at all obvious—at first thought —that having two perfectly good, usable arms could be a real handicap to a man...

"To be, or not to be—that is
the question.
Whether 'tis nobler in the mind
to suffer
The slings and arrows of outrageous
fortune,
Or to take arms . . ."

Hamlet, Act III, Scene I



THE rocket was on the way up, but Professor Lightning didn't seem to care. Outside the cooktent Wrout flapped his arms and, on that signal, Seaman started up the big electric band, whooping it up with John Philip Sousa for openers, while all over the midway the lights snapped on, big whites and yellows, reds, greens, purples and dusky violets framing, in a titillating dimness, the front flap of the girlie tent. The outside talkers were busy outside the spectacle tents like Wicks' Hell Drivers, Biggest Auto Show in Fifty States—outside the grind shows, the eats, the rides: "Here and now, for the fourth part of one single dollar bill, the most amazing . . ." ". . . Terrifying and strange beings from the farthest reaches of the Earth who will exhibit . . ." ". . . Dances learned at the Court of the Sultan, Ay-rab dances right here, right on the inside, for only—"

And the crowd, filing in, laughed and chattered and shrieked on swooping rides, the Great Crane, the Space Race, the Merry-Go-Round and the Horses, threw down money to win a kewpie doll, a Hawaiian lei, a real life-size imitation scale model of Luna in three real dimensions . . . living it up on the first show, while the rocket climbed on and out, and bubbled excitement in the blood.

The rocket was up: the carnival was open. But Professor Lightning didn't seem to care. He sat in the cooktent with his eyes hooded and hidden under the unshaded glow of a hundred-and-fifty-watt Forever bulb, while Charley de Milo fidgeted his feet, and listened, and tried to cut the old man off.

"Look, professor," he said nervously, "why don't we talk about it later? Table it, till after the show?" He scratched the side of his head with his left foot. "I got to go on in a couple of minutes," he said. "I can hear the talker going now. I got to—"

"Forget the show," Professor Lightning said. His voice was flatter and harsher, and his face more tense, than Charley ever remembered seeing it. "The show isn't important."

Charley blinked, trying to understand. "But, Professor—"

"Listen to me," Professor Lightning said. "The world is at the beginning of a new cultural revolution. Since the Cold War melted, and freedom of inquiry and research began to live again on both sides of the old Iron Curtain, science has begun a new Renaissance. The cultural interflow has—"

"Please, professor," Charley said miserably, rubbing his toes together. "There isn't much time before I got

to go on. And you ought to be inside the Science tent, too, because any minute—"

"If I am not in the tent," Professor Lightning said calmly, "I will not appear in the show. It does not matter."

"But they'll fire you," Charley said. He grabbed for a cigarette with his right foot and got it into his mouth. Striking a match with his left foot, he lit the cigarette and blew out a long, ragged plume of smoke. "If you're not there on time," he said in strained tones, "they'll fire you. And what about me?"

Professor Lightning gestured with both big hands. It was the same movement he used every night, when he showed the crowd there were no wires or batteries secreted on his person. Charley half-expected him to grab hold of a couple of light bulbs and show them glowing in his fists. But the gesture was meant, this time, as an aid to relaxation. "Don't worry," Professor Lightning said, in a grating sort of caricature of a soothing tone. "If they fire me . . . well, then, they save me the trouble of quitting. And as for you, my boy, a carnival job should be the furthest thing from your thoughts."

"Well, it isn't," Charley said sourly. "And if you'll excuse me, professor, I care how I get the money to eat, even if you don't. I got a good job—"

"You won't need your job," Professor Lightning said, "if you'll listen to me."

Charley made up his mind. Much as he hated to be impolite, there were some things more important than social forms, he decided. He stood up. "After the show, professor," he said with firmness, and went out of the cooktent, heading at a rapid dogtrot for the big tent at the other side of the midway. As he reached it he could see Dave Lungs, the outside talker, climbed up on the front platform to begin his spiel.

"Marvels of the world!" Dave announced without preliminary. "Wonders of the natural universe! Surprises and startling sights for every member of the family!" By the time he had got that far, a crowd was beginning to collect in front of the platform. "For the fourth part of a single dollar bill—" Dave went on, but Charley didn't have the time to listen; he was in the bally.

He lifted the backflap of the tent with one foot, and wriggled inside.

As he made his way to the cluster of people near the front flap, past the booths and stands, he felt an enormous sense of relief. He had made it—with all of fifty seconds to spare.

Ned and Ed stood next to him. "Where you been?" Ed said in a nasal whisper.

"I got held up," Charley explained. "Professor Lightning, he was talking to me, and—"

"Later," Ned said. His voice was lower and throatier than Ed's; it was the only way Charley could tell them apart, but then, he thought, nobody ever had to tell them apart. They were, like all Siamese twins, always

together. "We're going on," Ned said, and he and his twin moved forward.

Charley moved into place behind them, and came out blinking in the glare of the front platform.

"Siamese twins," Dave was shouting. "A contemporary marvel of science, ladies and gentlemen—and here we have . . ."

Charley stepped forward as Ned and Ed stepped back into the shadows again.

". . . .Charley de Milo! Ladies and gentlemen, the world-wide fame of this brave and talented boy is stupendous! His feats of skill will amaze you! Watch him thread a needle! Watch him comb his hair! And all for one thin quarter, ladies and gentlemen, only the fourth part—"

The electronic band choked on Sousa, coughed and began again with Kabalevsky. Charley watched the audience below, staring up at him, hundreds of faces. He heard their gasp as he flexed his shoulders and turned. He grinned down, taking a second longer than usual, and then stepped back, still grinning.

"Charley de Milo, the Armless Wonder!" Dave said. "And many more sights inside, ladies and gentlemen, sights to amaze you, sights to chill your very blood, sights . . ."

One-thirty, and the last show over. The rocket had come down for the night; all over the midway lights were blinking off and silence was creeping, like a stain, over the ground. Professor Lightning was sitting on his bunk, in the small tent he shared with Erma the Fish Girl. Erma was out drinking with Dave Lungs and some of the others, and only the professor and Charley de Milo were in the room. Charley was sitting on Erma's bunk, looking resigned.

"Well, if you still want to talk to me," he said, "now's your chance. O.K.?"

"I certainly want to talk to you," Professor Lightning said firmly. "I want to tell you of the most important moment of your life."

Charley tried to think of something to say to this, but there wasn't anything. He shifted on the bunk, scratched at his nose with his left foot, and grinned spastically. "Sure," he said at random. "And, by the way, I'm sorry about before, professor. But the show was going on, and—"

"The show," Professor Lightning said, in tones of the utmost contempt. "Forget about the show—now, and tomorrow, and forever."

"But—"

"No words," Professor Lightning said, raising a hand delicately. "Please. Allow me to tell you of my invention."

Charley sighed and lay back on the bed. "Invention, professor?" he said. "You mean sort of a machine?"

For some reason, Professor Lightning looked irritated. "It's not a machine," he said flatly. Then he sighed and his tone changed. "Charlie, my boy," he said, "do you remember what I was telling you before? About how the world has en-

tered a new Age of Science? How new inventions, new discoveries, are coming along every day?"

"Well, sure," Charley said. "The papers talk about it every once in a while. You know, I see the papers, or the Chicago *American*, anyhow. My mother sends it to me. She likes the columns."

"Why," Professor Lightning went on, as if he hadn't been listening at all, "right here in Wrout's Carnival Shows, we have things that just didn't exist ten or fifteen years ago. The electronic band. The Forever bulb."

"That's right," Charley put in. "And look at Joe Wicks. Why, he can do tricks with all those new things they got on cars, tricks nobody ever did before or even thought about in the old days."

"And more fundamental discoveries," the professor said. "Chadwick's Law of Dimensionality, Dvedkin and the Ontological Mean . . . oh, I keep up with the literature. No matter what's happened to me, I keep up with the literature."

Charley sighed, very softly so as not to injure the professor's feelings. But he did hope the old man wasn't going to start on all those stories about his lost career again. Charley knew—everybody in the Wrout show did—that Professor Lightning had been a real professor once, at some college or other. Biology, or Biological Physics, or something else—he'd taught classes about it, and done research. And then there had been something about a girl, a student the professor had got himself involved with. Though it was pretty hard to imagine the professor, white-haired and thin the way he was now, chasing after a girl.

He'd been fired, or something, and he'd drifted for a while and then got himself an act and come with a Carnival. Charley knew the whole story. He didn't want to hear it again.

But the professor said: "I'm as good as I ever was—better than I ever was, my boy. I've been keeping up, doing experiments. I've been quiet about it."

Everybody, Charley thought, knew about Professor Lightning and his experiments. If they kept the old man happy, kept him contented and doing shows, why not? After all, the old guy didn't drink or anything really serious; if he wanted to play around with test tubes and even Bunsen burners, people figured, why, let him.

But Professor Lightning thought nobody knew. Well, he had been a real professor once, which is to say a square. Some people never really adjusted to carny life—where everybody knows everything.

Charley figured maybe it was better to act surprised. "Really?" he said. "Experiments?"

Professor Lightning looked pleased, which satisfied Charley. "I've been on the track of something big," he said. He seemed to be talking more to himself than to Charley. "Something new," he said. "And at last . . . at last, my boy, I've found it. I'll be famous, Charley, famous—and so will you!"

"That's nice," Charley said politely. Then he blinked. "But what do you mean," he added, "me?"

"I want you to help me," the professor said. He leaned forward, and in the dim light of the tent's single lamp, his eyes glittered. "I want you to come with me."

"Come with you?" Charley said, and swallowed hard. He'd never thought, the way some did, that the old man was crazy. But it did look as if he'd slipped a couple of cogs for sure and for real. "Where?" Charley said.

"Washington," the professor said instantly. "New York. London, Paris. Rome. The world, Charley. The world that's going to do us homage."

Charley shifted a little in the bed. "Look, professor," he said, "I've got a job, right here in the carny. I couldn't leave here. So suppose we just—"

"Your job?" the professor said. "Your job's gone, my boy. Wait. Let me tell you what I've discovered. Let me tell you what has happened—happened to you, my boy. To you, and to me."

Charley sat upright, slowly. "Well," he said, "all right, professor."

Professor Lightning beamed, and his eyes glittered brighter and brighter. "Limb regeneration," he said, and his voice was as soft and quiet as if he'd been talking about the most beautiful woman in the world. "Limb regeneration."

Charley waited a long minute before he admitted to himself that he didn't have the faintest idea what the professor was talking about. "What?" he said at last.

Professor Lightning shook his head slightly. "Charley," he said softly, "you're an Armless Wonder. That's right, isn't it?"

"Sure it is, professor," Charley said. "You know that. I was born that way. Made a pretty good thing out of it, too."

"Well," Professor Lightning said, "you don't have to be one. Can you realize that?"

Charley nodded slowly. "Sure I don't," he said. "Only it's pretty good money, you know? And there's no sense in sitting around back home and feeling sorry for myself, is there? I mean, this way I can make money and have a job and—"

"No," Professor Lightning said emphatically.

Charley blinked. "No?" he said.

Professor Lightning shook his head, meaningfully. "Charley, my boy," he said, "I don't mean that you should go home and mope. But think about this: suppose you had your arms? Suppose you had two arms, just like everybody else."

"Why think about anything like that?" Charley said. "I mean, I am what I am. That's the way things are. Right?"

"Wrong," Professor Lightning said. "I can give you arms, Charley. I can make you normal. Just like everybody else."

"Well," Charley said. After a few seconds he said: "Gee." Then he

said: "You're kidding me, professor."

"I'm perfectly serious," Professor Lightning said.

"But—"

"Let me show you," Professor Lightning said. He stood up and went to the flap of the tent. "Come with me," he said, and Charley got up, dumbly, and followed him out into the cool darkness outside.

Later, Charley couldn't remember all that Professor Lightning had showed him or told him. There were some strange-looking animals called salamanders; Professor Lightning had cut their tails off and they'd grown new tails. That, he said, happened in nature. But he had gone a step farther. He had isolated the particular factor that made such regrowth possible.

Charley remembered something about a molecular lattice, but it didn't make any sense to him, and was only a puzzle. But the professor told him all about the technique, in a very earnest and scientific voice that was convincing to listen to, and showed him mice that he'd cut the tails off of, and the mice had brand-new tails, and even feet in one or two cases. There were a whole lot of small animals in cages, all together in back of the professor's tent, and Charley looked at all of them. The professor had a flashlight, and everything was very clear and bright.

When the demonstration was over, Charley had no doubts at all. It was obvious to him that the professor could do just what he said he could do: grow limbs on things. Charley scratched his head with his left foot, nervously.

"That's why I came to you," the professor said. "I need a human being—just to show the scientific world that my technique works on human beings. And I've worked with you for a number of years now, Charley."

"Five," Charley said. "Five since you came with Wrout."

"I like you," the professor said. "I want to make you the first, the very first, person to be helped by my technique."

Charley shifted his feet. "You mean you want to give me arms," he said.

"That's right," the professor said.

"No," Charley said.

Professor Lightning nodded. "Now, then," he said. "We'll get right to work on . . . Charley, my boy, what did you say?"

Charley licked his lips. "I said no," he said.

Professor Lightning waited a long minute. "You mean you don't believe me," he said at last. "You think I'm some sort of a crackpot."

"Not at all," Charley said politely. "I guess if you say you can do this . . . well, I see all the animals, and everything, and I guess you can do it. That's O.K."

"But you're doubtful," Professor Lightning said.

Charley shook his head. "No," he said. "You can do it, all right. I guess I'm sure of that, professor."

"Then," the professor said, in a tenser voice, "you think it might be dangerous. You think you might be hurt, or that things might not work out right, or—"

"Gee," Charley said, "I never thought of anything like that, professor. I know you wouldn't want to hurt me."

"I certainly wouldn't," Professor Lightning said. "I want to help you. I want to make you normal. Like everybody else."

"Sure," Charley said uncomfortably.

"Then you'll do it," Professor Lightning said. "I knew you would, Charley. It's a great opportunity. And I offered it to you because you—"

"Gee,I know," Charley said, feeling more uncomfortable than ever. "And don't think I don't appreciate it. But look at it my way, professor." He paused. "Suppose I had two arms —just like everybody else, the way you tell me. What would happen to me?"

"Happen?" Professor Lightning blinked. "Why, Charley . . . why, you could do anything you liked. Anything. You'd have the same opportunities as anybody else. You could be . . . well, my boy, you could be anything."

"Could I?" Charley said. "Excuse me for talking about this, professor, but I've had a lot of time to think about it. And it's all sort of new to you. I mean, you weren't born the way I was, and so you just don't understand it."

Professor Lightning said: "But, my boy—"

"No," Charley said. "Let me explain this. Because it's important." He cleared his throat, sat down on the ground and fumbled for a cigarette. He found one in his shirt pocket, carried it to his lips with his right foot, and lit a match with his left. When he was smoking easily, he went on.

"Professor, do you know how old I am?" he said. "I'm forty-two years old. Maybe I don't look it, but that's how old I am. Now, I've spent all my life learning to do one thing, and I do a pretty good job of it. Anyhow, good enough to get me a spot with Wrout's show, and probably with anybody else I wanted to work for."

"But your arms—" the professor said.

"That's what I mean," Charley said. "I don't have any arms. I never had any. Maybe I miss 'em, a little—but everything I do is based on the fact that I don't have 'em. Now, professor, do you know what I am?"

Professor Lightning frowned. "What you are?" he said.

"I'm an Armless Wonder," Charley said. "That's a pretty good thing to be. In a carny, they look up to an Armless Wonder—he's a freak, a born freak, and that's as high as you can go, in a carny. I get a good salary—I send enough to my mother and my sister, in Chicago, for them to live on. And I have what I need myself. I've got a job, professor, and standing, and respect." He paused. "Now, suppose I had arms. I'd have to start from scratch, all over again. I'd have to start from the bottom up, just learning the basic elements of any job I signed on for. I'd be a forty-two-year-old man doing the work of an eighteen-year-old. And not making much money. And not having much standing, or respect."

Charley took the cigarette out of his mouth with his right foot, held it for a second and put it back.

"I'd be normal," he said. "I'd be just like everybody else, professor. And what do I want anything like *that* for?"

Professor Lightning tried everything, but it wasn't any good. "Fame," he said, and Charley pointed out, calmly and reasonably, that the kind of fame he'd get from being an experimental subject was just like being a freak, all over again—except that it would wear off, and then, he asked, where would he be? Professor Lightning talked about Man's Duty to Science, and Charley countered with Science's Duty to Man. Professor Lightning tried friendship, and argument, and even force—but nothing worked. Incredible as it seemed to the professor, Charley was content to remain a freak, an Armless Wonder. More, he seemed to be proud and happy about it.

It was too bad that the professor didn't think of the one argument that might have worked. In the long run, it wouldn't have made any difference, perhaps—but it would have cleared matters up, right there and

then. Because the one workable argument had a good chance of succeeding.

But, then, Professor Lightning really didn't understand carny. He never thought of the one good argument, and after a while he gave up, and went away.

Of course, that was several days later. Professor Lightning told Charley that he was leaving for New York, and Charley said: "What? In the middle of the season?" Then he told Wrout, and Wrout screamed and ranted and swore that Professor Lightning would never work in carny again. "I'll have you blacklisted!" he roared.

And Professor Lightning shrugged and smiled and went away to pack. He took all his notebooks, and all the cages with little animals in them, and he didn't seem at all disturbed. "I'll find another subject," he told Charley, when he left. "When they find out what I've got, in New York, they'll provide me with subjects by the hundred. I did want to help you . . ."

"Thanks," Charley said honestly. ". . . But that's the way things are, I suppose," Professor Lightning said. "Maybe some day you'll realize."

Charley shook his head. "I'm afraid not, professor," he said, and Professor Lightning shook Charley's foot, and left, and Charley went back to work in the freak show, and for a while he didn't even think about Professor Lightning. Then, of course, the news began to show up in the Chicago *American*, which Charley got two or three days late because his mother sent it to him by mail.

At first Charley didn't realize that Dr. Edmund Charles Schinsake was Professor Lightning, but then the *American* ran his picture; that was the day Professor Lightning was awarded a medal by the AMA, and Charley felt pleased and happy for the old man. It looked as if he'd got what he wanted.

Charley, of course, didn't think much about the professor's "limb regeneration"; he didn't need it, he thought, and he didn't want it, and that was that.

And then, one night, he was dropped from the bally, and he asked Dave Lungs about it, and Dave said: "Well, we want the biggest draw we can get, out there before the show," and put Erma, the Fish Girl, out in his place. And Charley started to wonder about that, and after a few days had gone by he found himself talking about it, to Ed Baylis, over in the cooktent while they were having lunch.

Baylis was a little man of sixty or so, with a wrinkled face like a walnut and a powerful set of lungs; he was Wrout's outside talker for the girlie show. "Because I'm old," he said, grinning. "I don't have trouble with the girls. And if I got to take one off the bally or out of the show there's no personal stuff that would make it tough, see what I mean?"

"That's what I'm worried about," Charley said.

"What?" Ed asked. He speared a

group of string beans with his fork and conveyed them to his mouth. Charley, using his right foot, did the same.

"The bally," Charley said. "The way things are, Dave took me off, and I'm worrying about it."

"Maybe some kind of a change," Ed said.

Charley shook his head. "He said . . . he said he wanted the biggest draw out there. Now, you know I'm a big draw, Ed. I always have been."

"Sure," Ed said. He chewed another mouthful and swallowed. "Still, people want a change now and then. Doesn't have to mean anything."

"Maybe not," Charley said uncomfortably. But he wasn't convinced.

The season drew to a close, and Charley went off to the Florida Keys, where he spent a month living with some friends before holing up with his mother and sister for the winter. He was offered a job in New York, at a year-round flea museum in Times Square, but after some thought he decided against it. He'd never had to work winters, and he wasn't going to start.

After all, he was still doing well, wasn't he? He told himself emphatically that he was. He was an Armless Wonder, a born freak, the top of the carny ladder, with a good job wherever he cared to look for one.

He had to tell himself that quite a few times before he began to believe it.

Spring came, and then summer, and Charley kissed his mother and his sister good-by and joined Wrout's Carnival Shows in Summit, Idaho, three days before their opening. He didn't notice much change from previous years, but it took an effort not to notice some things.

Not like the new man who'd taken Professor Lightning's place—a tall thin youngster who had an Electric Chair act. Or like the periodic quarrels between Ned and Ed; it seemed they'd met a girl over the winter season, and disagreed about her. Ed thought she was perfectly wonderful; Ned couldn't see her for beans.

No, things like that were a part of carny; you got used to them, as the show rolled along year after year, and paid no more attention to them than a housewife pays to rather uninteresting back-fence gossip.

It was something else that had changed, something important.

His contract, for instance. It was made out for the same pay as he'd been getting, but the option periods were shortened up; suddenly, Charley was living from season to season, with almost no assurance of continuous, steady work. Old man Wrout had looked a little less than happy when he'd given Charley the contract; he'd almost seemed ashamed, and he hadn't really looked Charley in the eye once. But when Charley asked what was wrong, he got no answer.

Or none that meant anything. "It's just the way things are," Wrout mut-

tered. "Don't make no difference, kid."

But it did make a difference. Charley wasn't out in the bally any more, either; he was backstage among the second-rate acts, the tattooed man and the fire-eater and the rest, while Erma and Ned and Ed and the top-liners took their bows out before the crowd, pulling them in, and got the gasps and the applause.

The crowds in front of his own platform, inside during the show, were smaller, too. At first Charley thought that was due to the bally itself, but as the season began and wore on, the crowds continued to shrink beyond all expectation. Counting as he worked, combing his hair with one foot, drawing little sketches for the customers ("Take one home for only one extra dime, a treasured souvenir especially personalized for you by Charley de Milo")—counting the house, he discovered one evening that he was the smallest draw in the tent. The tattooed man did better than Charley de Milo, which was enough of a disgrace; the rest were so far ahead that Charley didn't even want to think about it.

His first idea was that somebody was out to get him. He could feel the muscles of his shoulders and back bunching up when he tried thinking what to do about the sabotage that had struck him; but an Armless Wonder has one very real disadvantage. He can comb his own hair and brush his own teeth; he can feed himself and—with proper clothing—dress himself; he can open doors and shut windows and turn the pages of books. But he can't engage in a free-for-all fight, not without long and careful training in that style of battle known as *savate,* or boxing with the feet. Charley had never learned *savate;* he had never needed it.

For the first time since he could remember, he felt helpless. He wasn't normal; he couldn't do what any normal man could do. He wanted to find the man who was sabotaging his show, and beat him into a confession, and throw him off the lot—

And he couldn't.

The muscles of his back pulled and pulled at him. He clenched his jaw. Then Dave Lungs came over to his platform and he forced himself to relax, sweating. There were four or five people behind Dave, ordinary marks with soft, soft faces and round eyes. While Dave talked Charley went through his act; perhaps ten other marks were scattered in the tent, standing at other platforms, watching other acts even without Dave there to guide them and talk them up.

And when he was through Dave sold exactly one of the sketches Charley had done. One. An old man bought it, a chubby little Santa Claus of a man with eyes that twinkled and a belly that undoubtedly shook like a jelly bowl when it was freed from its expensive orlon confines. Dave went off to the next platform, where Erma stood, and the marks followed him, and more drifted over. Erma had ten customers, Charley noticed, and he grabbed a handkerchief from the

platform floor and wiped his damp face with one foot.

Something's wrong, he thought stupidly, and he must have said it aloud because, at his feet, a high, thin old voice said: "What was that, son? Did you say something?"

"Nothing at all," Charley mumbled, and looked down. The Santa Claus man was staring up at him. "Show's over," Charley said, more curtly than he meant. He took a deep breath and set his feet more firmly on the platform, but it didn't do any good. He was like a coiled spring, waiting for release.

"I don't expect any show," Santa Claus said. "Really I don't. But I did want to talk to you for a few minutes, if you don't mind."

"I'm not in a talking mood," Charley said. "Sorry." He was ashamed of the words as soon as he brought them out; that was no way to treat any stranger, not even a mark. But it was a long second before he could say anything else. Santa Claus stood watching him patiently, holding Charley's sketch by one corner in his left hand.

"I'm sorry," Charley said at last. "It . . . must be the heat. I'm kind of on edge."

"Of course," Santa Claus said. "I understand. Really I do."

There was a little silence. Dave and the crowd trailed away from Erma and headed for Senor Alcala, the fire-eater at the end of the row. Charley barely heard Dave's spiel; he licked his lips and said: "You wanted to talk to me."

"Now," Santa Claus said, "I don't want you to be ashamed of anything. There's nothing personal in this, really there isn't. But I do want to help if I can, help anyone who needs help."

"I don't need help," Charley said. "I'm sorry." He tried to keep his voice gentle. The old man obviously meant well; there was no sense in hurting him.

"It's your . . . infirmity," Santa Claus said. "Boy, have they been keeping the news from you?"

"News?" Charley said, with a sudden sick feeling.

"In New York," Santa Claus said. "There's a doctor there—a man who can help people like you. He has a new technique. I was reading in the papers just the other day—there was a man injured in a railroad accident, who lost one arm and one leg. This doctor used him as his first subject."

"He said he'd find another one," Charley put in without thinking.

"Another?"

"It doesn't matter," Charley said. "You were going to suggest that I go and see this doctor. Is that right?"

"Well," Santa Claus said, seeming oddly embarrassed, "it can't hurt, you know. And it might help. Really it might. And then . . . then you might not have to . . . have to be the way you are, and do what you do."

Charley took a long breath. "I'll think about it," he said, in the very politest tone he could manage.

"I only want to help," Santa Claus said.

"I'm sure you do," Charley said. "And thanks."

"If there's anything I can do—"

Charley smiled down. "That's all right," he said. "Thanks. But I guess you'd better join the rest—if you want to see the show at all."

Santa Claus said: "Oh. Of course." He turned and found the group just leaving Senor Alcala's platform, and scurried off to catch up with them. Charley stared at his retreating back, fighting to stay calm.

That was the way marks were, of course, and there wasn't anything to be done about it. It was always "the way you *have* to be," and "the things you *have* to do." It never seemed to enter their heads that pity was unnecessary baggage where a born freak was concerned, any more than it had entered Professor Lightning's head. A born freak, Charley reflected, had a pretty good life of it, all told; why, even marriage wasn't out of the question. Charley knew of some very happy ones.

But the marks pitied you, Charley thought. And maybe it wasn't especially smart to tell them anything different; pity, as much as anything else, keep them coming. Pity, and a kind of vicarious victory. When Charley threaded a needle, he was telling all the marks: "It doesn't matter what kind of accident happens to you—you can overcome it. You can go on and do anything. It's all what you make it—everything, every bad turn life hands you can be made into something better. If I can do it, you can do it."

That was what the marks felt, Charley thought. It was wrong-headed, it was stupid, and it could be a simple nuisance—but it brought in the dough. Why argue with it? Why try to change it?

Charley nearly grinned. The crowd of marks moved on down the other side of the tent, and Charley watched them. Ned and Ed drew the biggest crowd, an attentive, almost rapt crew who could be suckered into buying anything the Siamese twins wanted to sell them. Dave milked them for all they were worth, and Charley nodded quietly to himself. Dave was a good carny man.

He worked for the good of the show. Or—did he?

Dave had taken him off the bally. Did Dave have some reason to hate him? Could Dave be out to get him?

Charley couldn't think why, but it was a lead, the only one he had. And if Dave did turn out to be behind everything that was happening, Charley knew exactly what he was going to do.

He couldn't beat Dave himself.

But he had friends—

After the show, that night, Charley went hunting for Ed Baylis. Ed had been around Wrout's a long time, and if anything were going on Ed would know about it. Charley went down to the girlie tent, and found Ed just clearing up. All over the midway, the lights were going out, and the Mars Race game gave one final

roar and came to a halt. The last customers were leaving.

Ed looked up when he came over. Charley didn't ease into the subject; he couldn't. "Something's wrong," he said at once. "I'm off the bally, and the crowds are going down. I don't like it, Ed."

Baylis shrugged. "Who would?" he said.

"But—something's wrong," Charley said. "Ed, you know what's happening. You get the word. Let me in on it."

"I don't know anything about this," Ed said at once. But his face was still, his eyes shuttered in the darkness.

Charley kept after him. They went behind the girlie tent, talking softly. Overhead a rocket burned by, but neither man looked up.

At last Ed sighed. "Just forget about it," he said. "Just do your job. That's all that matters. You don't want to know anything else."

"Why don't I?" Charley said. "Sure I do. And it's no good telling me to do my job. The way things are running, Ed, I'm not going to *have* a job very long."

"There's nothing you can do about it," Ed said. "Believe me. You don't want to know because knowing wouldn't do you any good. And you wouldn't believe me if I told you."

"Try me," Charley said. "Go ahead." He scratched at one shin with the other foot.

"Well," Ed began, and then stopped. He shook his head. "Look, Charley, let me tell this my way. Something like this happened before. A long while back—before the Cold War started, let alone ended."

"Go ahead," Charley said. A drop of sweat ran slowly down his forehead. He tried to ignore it.

"Did I ever tell you I used to talk for a strong-man act?" Ed said. "Not a side-show talker, nothing like that; this guy had an act of his own, full tent and flies. Gondo, his name was, and I can still see those flies: *Eighth Wonder of the World* up on top, red on blue, and just *Gondo* underneath, pure white with red outlining. Class, but flashy, if you see what I mean. You never saw the like, kid."

Charley shook his head. "O.K.," he said. "But what does this have to do with—"

"Well," Ed cut in, "that was years ago; I was a youngster, pretty well just setting out. And Gondo drew crowds—big crowds. Lifting a wagonload of people on his back—that was one of his tricks. I think Sandow himself used to do it, but he had nothing on Gondo; the guy had style. Class. And he was a draw; I was working for J. C. Hobart Shows then, and there was nothing on the lot to top him."

Ed paused, rubbing at his chin reflectively.

"Then the crowds started to fall off," he said. "Just like with you, Charley. And nobody knew why. Gondo was doing the same act—no change there. So the change had to be some place else."

"Same with me," Charley said.

"Sure," Ed said. "The same with

you. Charley, do you follow the papers?"

"I guess so," Charley said. "One, anyway. My mother sends it to me from Chicago. She likes the—"

"Sure," Ed said. "Well, did you ever hear about a Dr. Schinsake? Edmund Charles Schinsake?"

Charley snorted in surprise. "Who do you think you are?" he said. "Santa Claus?"

"What?"

"Nothing," Charley said. "It's just . . . well, nothing. But sure, I know the guy. And so do you." He explained.

"Professor Lightning?" Ed said. "I never saw a picture. But it doesn't matter—except maybe it'll make the guy easier to see. Because this is it, Charley; I think you ought to go and see him."

There was a little silence.

"You, too?" Charley said. "You mean, so I can stop being a poor, poor cripple and stop making lots of money? Is that what you're talking about?"

"Listen, Charley," Ed said. "I—"

"Just give up," Charley cut in. "That's what you want me to do. Just give up and go to the good old doctor and ask him to give me some arms. Is that what you wanted to tell me about this Gondo of yours? How he just gave up and got a nice little white cottage some place and got a nice little low-paying job and lived unhappily ever after, because a carny isn't a healthy, well-adjusted life? Is that it, Ed?"

Ed rubbed at his chin. "No, Charley," he said. "No, kid. Not at all. But I think you ought to—"

"Well, I won't," Charley said. "Look, Ed: I want you to get this straight. I don't care who's against me, or what they've got planned. I'm not going to give up. I'm going to find out what's going on, and I'm going to lick it. Have you got it?"

Ed sighed. "I've got it," he said. "But, Charley: there are some things you don't lick."

"I'll find out," Charley said. "Believe me, Ed. I'll find out."

But nobody else knew a thing—or, at least, nobody was willing to talk. Ned and Ed offered any help they could give—but said nothing that helped. Erma was puzzled, but ignorant; Senor Alcala knew nothing, and no one else was any better off, as far as Charley could discover.

After a week, Charley decided there was only one person for him to see. Ed Baylis had recommended him, and so had the little Santa Claus. Professor Lightning didn't look like much of a lead, but there was nothing else left. The audience was still dropping, little by little, and Charley knew perfectly well that something had to be done, and fast.

Getting a leave of absence was even easier than he'd expected it to be; and that was just one more proof of how far his standing with the show had dropped. People just didn't care; he wasn't a draw any more.

And his standing with the carny was all he had left. He had caught himself, lately, wondering if he

would really be so badly off with two arms, like everybody else. The idea frightened him, but the way it kept coming back frightened him even more.

Leaving the carny lot, of course, he put on his sandals; outside the carnival, he had to wear shoes. They were laceless, of course, and made to be kicked off easily. Charley slipped into them and thought wryly of the professor and his "scientific Renaissance." The shoes were a new plastic, lightweight and long-lasting, but the dyeing problem hadn't quite been solved. Instead of a quiet, dull brown, they were a garish shade that almost approached olive drab.

Well, he thought, nothing's perfect. He shrugged into a harness and had his single suitcase attached to it; the harness and case were lightweight, too, and Charley headed for the station walking easily.

He climbed aboard the train and dropped his suitcase into the Automatic Porter, and then went to find a seat. The only one available was next to a middle-aged man chewing a cigar in a sour silence. Charley slipped into his seat without a word, and hoped the man would ignore him. He had a face like an overripe summer squash, and his big hands, clasped in his lap, were fat and white, covered with tiny freckles. Charley leaned back and closed his eyes.

A minute or so passed in silence.

Then a voice said: "Heading for New York?"

"That's right," Charley said tiredly. He opened his eyes. The middle-aged man was leaning toward him, smelling of his cheap cigar.

"Likewise," the man said. His voice was hoarse and unpleasant. "I thought you might be."

"That's right," Charley said. "Long trip." He hoped desperately that the man would leave him alone. He wasn't on display now; he wanted the time to think, to try and figure out what had been happening. He had to have some questions to ask Professor Lightning, and that meant that he had to have some sort of plan of action.

"Going to see that doctor," the middle-aged man said. "That right?"

"That's right," Charley said. Apparently Professor Lightning had become a nine-day wonder; anyone going to New York was presumed to be going to see him.

Then Charley corrected himself. Not anyone.

Any cripple.

"Get the arms fixed, right?" the middle-aged man said.

"That's right," Charley said for the third time. Maybe the man would take the hint.

But he had no such luck. "That's a fine thing the doctor is doing," he said. "I mean, helping all these people. Don't have to be . . . well, look, bud, don't take me personally."

"I don't mind," Charley said. "I'm used to it."

"Sure," the man said. "Hey, by the way. My name's Roquefort. Al Roquefort."

"Charley de Milo," Charley said.

"Glad to know you," the man said. "So while we're traveling companions, you might say . . . might as well get to be friendly."

"Sure," Charley said tiredly. He looked round the car. A great many people seemed to be heading East. There were no other seats. Charley sighed and shrugged himself deeper into the upholstery.

"You know," Roquefort said suddenly, "I can't help thinking."

"Oh?" Charley said, fidgeting his feet.

"That's right," Roquefort said. "I mean, all these people. And Dr. Schinsake. I remember once, I went to a circus, or a sideshow."

"Carnival, probably," Charley put in, knowing exactly what was coming.

"Something like that," Roquefort said. "Anyhow, they had this sideshow, and there was a man there without any legs. Did all kinds of tricks—got along real good. But I can't help thinking now: he wouldn't have to get along that way any more. Because this doctor would fix him up."

"I guess so," Charley said wearily.

"Sure," Roquefort said. "It's a great thing, what he's doing. All these freak shows . . . you understand, it's just a name for them—"

"I understand," Charley said. "Don't worry about it." He shifted his feet nervously. Shoes always felt a little uncomfortable, even light-

weight sandals; he felt trapped in them. Now, if he had arms and hands . . .

He choked the thought off before it got any further.

"All these shows," Roquefort said, "why, there isn't any need for them any more. I mean the people without legs, or arms, anyhow. See? Because this doctor—"

"I see," Charley said.

"Why, anybody works in a show like that, I mean without arms or legs —why, he's just crazy, that's all. When he can get help, I mean."

"Sure," Charley said uneasily. "Sure, he's just crazy."

Roquefort chomped on his cigar and looked solemn and well-informed. Charley shivered slightly, and wondered why.

"Just crazy." Was that what they thought, he wondered. Was that what they were thinking when they looked up at him?

He shivered again and slipped his shoes off quietly. Immediately, he felt a little better.

But not very much.

New York was a madhouse worse than any carnival Charley had ever seen. He made his way, harness and suitcase on his back, through the station crowds and out into the taxi ramp. A line of the new cabs stood there, and Charley managed to grab one inches ahead of a woman with a small, crying child in tow. He gestured to the driver with his head, and the door slid open. He stepped inside, released the catch that let his suitcase thump to the floor, and sat down with a sigh.

"Tough, hey?" the cabbie said. His glowing nameplate read *David Peters Wells*. He turned around, showing a face that had little in common with the official license photo, under his name. He was swarthy and short, with large yellowing teeth and tiny eyes. "Where to, Mac?" he said.

Charley licked his lips. "I really don't know," he said.

The cabbie blinked. "What?"

"I'm going to need some help," Charlie said. "I want to find a Dr. Schinsake, but I don't know where he is. If you can drive me to a drugstore, where we can look him up in a phone book—"

"Dr. Schinsake?" the driver said. "That's the guy who grows things? I mean, arms and legs? Like that?"

"That's right," Charley said.

"O.K., buddy," the driver said. "Just hang on." The cab started with a cough and a roar, and shot out of the terminal like a bazooka shell. Over the noise of travel, the cabbie said: "Going to get yourself fixed up? No offense, Mac."

"No offense," Charley said. "I'm just going to talk to him."

"Oh," the cabbie said. "Sure." There was silence for a second. Then the cabbie turned around. The machine shot ahead, down a wide avenue filled with cars. Charley took a deep breath and forgot to let it go. "You know," the cabbie said, "I seen something funny the other day."

"Really?" Charley said, through clenched teeth.

The cabbie turned back casually, flicked the wheel to avoid an oncoming truck, and continued: "Funny, yeah. Went to the Flea Museum . . . you know, the sideshow here, on Forty-second?"

"I know it," Charley said. He'd been offered winter work in the place several times, though he'd never accepted. Everyone in carny life knew of the place.

"And, anyhow, I went down the other day, and there was this guy . . . he was like you, Mac, I mean no arms. You don't mind me talking about it?"

Apparently everybody thought he was sensitive on the subject, Charley reflected tiredly. "I don't mind," he said.

"Sure," the cabbie said. A red light showed ahead and the cab screeched to a halt. "Anyhow, there he was, like a freak, you know? Hell, Mac, I was mad. I mean mad. The guy wants me to pay money to see him; he don't want to go get cured. He's like lazy, Mac. Lazy. Wants to sit around and let me pay money I work hard for, like some kind of a stuffed exhibit he thinks he is." The light changed; the cab shuddered and moved on. "And this doctor right here in the same city. Now, what do you think of that?"

Charley shrugged. "I wouldn't know," he said cautiously. He took out a cigarette with his left foot, lit it with his right, and slid both feet back into his shoes. "Nearly there?" he asked.

"No, offense, Mac," the cabbie said, sounding obscurely troubled. "We're there in a minute." He turned and stared narrowly at Charley. The cab shot blindly on. "Say, listen. That with the cigarette. You belong to some kind of sideshow? I mean, no offense—"

"No offense," Charley said. "That's right. I'm with a carnival."

"We'll, you're doing the right thing," the cabbie said, turning back to the road again. Amazingly, there was no obstruction before them. "I mean, a guy has to be honest. With this doctor around, you can't be a no-arms guy any more; it's not fair. Right?"

Charley licked his lips. The cab stopped.

"Here we are," the driver announced.

Charley indicated his grouch-bag, still heavy with dollar bills, hanging round his neck. With scrupulous care, the driver extracted one bill. "Keep the change," Charley said. "And thanks for the conversation."

He stepped out, hooking the suitcase to his harness as he did so. And there, in front of him, was a small white-faced stone building. The cab roared away behind him, and Charley started across the sidewalk.

Now, in New York, he had found out what he was going to ask Professor Lightning. And it was the one thing he hadn't thought possible.

One flight of stairs led straight up from the doorway, and Charley took it slowly. At the top was a great wooden door with a brass plate screw-

ed to it, and on the brass plate a single name was incised: *Dr. E. C. Schinsake.* There was nothing else. Charley slipped the shoe off his right foot, and rang the bell.

A voice inside said: "Who's there? Who is it, please?"

"It's me, professor," Charley called. He slipped the sandal back on. "Charley de Milo. I came to see you."

"Charley—" There was a second of silence. "Charley de Milo?" Professor Lightning's grating voice said. "From the show?" Footsteps came across a room, and the door swung open. Professor Lightning stood inside, just as tall and white-haired as ever, and Charley blinked, looking at him, and past him at the room.

People didn't live in rooms like that, he thought. They were only for the movies, or maybe for millionaires, but not for people, real people that Charley himself knew to talk to.

The furniture—a couch, a few chairs and tables, a phonograph—was glitteringly new and expensive-looking. The walls were freshly painted in soft, bright colors, and pictures hung on them, strange-looking pictures Charley couldn't make sense out of. But they looked right, somehow, in that room.

On the floor there was a rug deeper and softer-looking than any Charley had ever seen. And, away to the right, two floor-length windows sparkled, hung with great drapes and shining in the daylight. There were flowers growing outside the sills, just visible above the window frames. Charley gulped and took a breath.

"Come in," Professor Lightning said. "Come in." In the midst of the riot of wealth, the professor didn't seem to have changed at all. He was still wearing the same ratty robe he'd worn in the carnival, his hair was still as uncombed. It was only on second glance that Charley saw the look in his eyes. Professor Lightning was Dr. Schinsake now; the eyes said that, and were proud of it. And the world agreed with Dr. Schinsake.

Charley came into the bright room and stood quietly until Dr. Schinsake asked him to sit down.

"Well, now, my boy," he said. "You haven't given me a word since you rang the bell, and I would like to know why you're here. Frankly, you're lucky to catch me in; but we were up late last night, working in the labs. I'm afraid I overslept a little." His eyes shone with the mention of his laboratories. It was a far cry from the back of the science tent, Charley supposed.

But he'd come for a definite purpose. He licked his lips, waited a second, and said: "Professor, it's about my arms. What you said you could do."

"Your arms?" The old man frowned. "Now? You've come to me . . . Charley, my boy, tell me why. Tell me why you have changed your mind now."

Charley nodded. "I . . . I didn't start out here to ask you about my arms," he said. "But on the way I started putting things together. Professor, why do people come to sideshows?"

The old man shrugged. "Entertainment," he said.

"Sure, but there are all kinds of entertainment," Charley said. "Like strong men. There used to be a lot of strong men in carnivals, but there aren't any more. And now I know why. Ed Baylis started to tell me, but I . . . well, never mind."

"Charley," the old man said. "What do strong men have to do with—"

"Let me tell you, professor," Charley said. "People don't care about strong men any more; there are too many gadgets around. Nobody has to be a strong man; nobody wants to watch one. They're useless. See?"

"Everyone can be his own strong man," the old man said.

"Right," Charley said. "The chain hoist—machines like that—they killed off the whole act. Years ago. And you've killed off the Armless Wonders and the Legless Wonders, professor. You've done it, all at once."

Professor Lightning shook his head. "I don't see—" he began.

"Anybody can grow new arms," Charley said. "So the man without arms—he's not an object of pity any more. He's just some guy who doesn't want to work. Nobody wants to go and see him; let him grow arms, if he doesn't want to be called a lazy bum. See?"

There was a little silence.

"I see," Professor Lightning said slowly. "Without pity, without a strong sense of identification, there is no audience."

"For me there isn't," Charley said. "Or for anybody like me."

Professor Lightning nodded. "Well," he said. "I hardly meant to . . . well, Charley, you came for something else." His face seemed to lengthen. "And I must tell you . . . Charley, I have been doing a lot of work. I am hardly a professional scientist; I have been away too long."

"But—"

"It is true," Professor Lightning said sadly. "Never mind; I've had my one discovery—how much an accident, no one may ever know. But I neglected to widen the scope of what I had done; I generalized too rapidly, my boy." He took a deep breath. "The method, the technique, is very complex," he said. "But imagine it this way: a man comes to New York. He explores it. Later, when he goes home, he is asked to draw a map of it—and he can do so, because he has the experience. He has the memory of New York, locked in his mind."

Charley nodded. "What does that have to do with me?" he said.

"The cells . . . the cells of the body seem to have such a memory," the professor said. "It is the basis of my technique."

Charley nodded. "O.K.," he said. "I don't care how it works, so long as it— It does work, doesn't it?"

The professor shook his head. Very slowly, he said: "Not for you, my boy. Not for you." He paused. "You see, you were born without arms. In such a case the cellular memory does not seem to exist—like a man who has never been to New York. He

cannot draw the map. He has no memory to begin with."

The silence this time was a long one.

At last Charley said: "But somebody could tell him. I mean about New York, so he could draw the map."

"Perhaps," the professor said. "We are working on it. Some day—"

"But not today," Charley said. "Is that it?"

"I . . . I'm afraid so," the professor said.

Charley sat for a long time, thinking. He pictured the carnival, and the shrinking audiences. Could he explain to them why he couldn't get arms? Would any audience stop to listen and digest the truth? Charley thought of the armless man in the Flea Museum, and decided slowly that no explanation would be good enough. People didn't stop to make small distinctions. Not in a sideshow. Not in a carnival.

No.

There was only one thing he could do; he saw that clearly. But it took him a long time to find the right words. At last he had them.

"Professor," he said, "suppose I go right back to being a side-show exhibit—but with a limited audience."

Professor Lightning looked puzzled. "What do you mean?" he said.

"Well," Charley said, carefully and with a sudden, surprising feeling of hope, "you don't happen to need a new guinea pig, do you?"

THE END

THE ANALYTICAL LABORATORY

Being pressed for space this time, herewith the report on the March, 1960 issue in brief form:

PLACE	STORY	AUTHOR	POINTS
1.	Deathworld (Conc.)	Harry Harrison	2.20
2.	Immortality for Some	J. T. McIntosh	2.26
3.	In Case of Fire	Randall Garrett	2.63
4.	The Barrier Moment	Winston P. Sanders	3.00
5.	Shotgun Wedding	Christopher Anvil	3.48

The close point-scores show the tight fight for the two bonus-bearing places!

THE EDITOR.

VIGORISH.....

Illustrated by Petrizzo

If it "takes a thief to catch a thief"...what does it take to catch a psi-gifted thief?

rug at my feet. I turned my swivel chair slowly back to my desk and riveted my eyes to the blotter. Snakes are ghastly things. But there was no future in letting them shake me up.

I bent over in my swivel chair and swung my left arm like a flail just below this rattler's raised head. He struck at me, but late, and missed. The swipe I took at him should have swept him over, but he got his coils around me. When I heaved back up straight before my desk, he was as neatly wrapped around my forearm as a Western Union splice.

Enough of his tail was free to make that buzz that means "Look

By WALTER BUPP

WHAT do you hate and fear the most? I know a girl who gags and throws up at the mere sight of a bird. Poor kid, when she was a barefoot moppet she stepped on a fledgling robin in the grass. She hasn't gotten over the squish of it yet.

Birds don't trouble me. I can look at them all day. It takes snakes to give me the green shudders. I hate them.

She was getting better at them, I decided. This was the fourth one since breakfast and the roughest-looking of the lot. It was a diamond-back rattler, and lay coiled on the

out!" About a foot of his business end stood up off my arm. His forked tongue flicked out over his horny lip, pink and dainty.

"Now, vanish!" I said to the snake. It didn't. Instead the door to my office opened, letting in a little more of the unmistakable smell of the hospital, as well as old Maragon, Grand Master of the Lodge. He was complaining and shaking a finger at me as he came toward my desk. He didn't jump more than a foot when he got a look at my arm. His shaggy gray eyebrows climbed way, way up his forehead in a mutely shouted question.

I wouldn't give the old goat the

time of day. When I dead-panned him, he shrugged and lowered himself into the chair beside my desk.

"Thought you hated snakes, Lefty," he said.

"A guy could get used to almost anything, Grand Master," I said. "I found a cobra under my pillow when I rolled out of the sack this morning. A coral snake fell out of the folds of my towel when I went to take a shower. Somebody stashed a bushmaster here in my locker to meet me when I dressed for surgery. I'm getting almost fond of snakes."

Maragon semaphored doubt by squeezing his eyebrows down in a scowl. "Even *real* snakes?" he protested.

"It's the most artful hallucination I've ever experienced," I granted. "This snake has weight, a cold feel and a scratchy scaliness. This new witch of yours really knows her stuff. I just would have thought . . ." I dribbled off, raising my shoulders.

"Thought what, Lefty?"

"Oh," I said. "That it was somehow beneath the dignity of the Grand Master to drag himself down here to the hospital just to add a little conviction to the hallucination. I mean, working up a big entrance, and all this pretense of your seeing a snake."

His smile was a little weary. "Try a lift, Lefty," Maragon said.

He had finally overplayed his hand. Hallucinations don't respond to telekinesis—there's nothing there to lift. I fixed on the rattler's crouching head and lifted. The TK jerked the S-shaped curve out of his neck. I could feel his coils fight my lift. At some moment there I must have gotten the point that *this* snake was real.

I guess I was screaming and shaking it from me for five minutes after Maragon had unwrapped the coils from my arm.

"All right. All right. All right," I said to him, shaking my head. "So it had no fangs. You've still got me sold. I'll go to Nevada for you." I'd have gone clear to Hell to get away from that hallucinating witch he had working on me. I'd gotten used to hallucinations—but who can get used to the doubt that one of those dreadful visions is real? I'd had my lesson.

It served me right, of course. It had begun when Peno Rose had first visored me from Lake Tahoe. I had told him "No." Too busy, *much* too busy, with TK surgery at Memorial Hospital. It didn't mean a thing to me that some cross-roader with plenty of TK was stealing the Sky Hi Club's casino blind. But Peno had known me from my days on the Crap Patrol, and wasn't much impressed that I'd reached the thirty-third degree. He'd gotten the Senior United States senator from Nevada to put heat on the Lodge.

When Maragon first visored me on it, I simply refused to discuss it and switched off. That was the big mistake. I had an obligation to the Lodge for my TK training, and there was no honorable way I could turn

my back on it. The Grand Master is a patient, if deadly, old goat, and he came after me in person.

I'd just walked out of surgery, and was still in mask and gown. The surgeon who had done the cutting while I had put TK clamps on the inaccessible arteries was at my side, breathing a sigh of relief that the patient hadn't died on the table. He'd still die, I figured, but not on the table. I'd felt the fluttery rasp of his heart muscle as it had strained against my lift. He didn't have too long.

"Thank God for a dry field," the scalpel surgeon said, politely holding out his left hand to me. I shook it with my left. That's why I hadn't done the cutting, too. There aren't any one-handed surgeons. My right arm looks fine. It just hasn't any strength. Old Maragon had told me once that my TK powers were a pure case of compensation for a useless arm. The surgeon dropped my hand. "You're the best, Wally Bupp," he said. He's too good a friend of mine to call me "Lefty" and remind me that I'm a cripple.

It was Maragon who did that. I hadn't noticed him, but somebody gave me the grip, and I looked around. He was back against the wall, short, gray and square. I gave his ear lobe a TK tug in return, harder, perhaps, than was necessary, and nodded for him to follow both of us to my office.

"We'll have to talk about it, Lefty," he said, as he closed the door against the smell of iodoform.

"No, we don't," I said. "I don't care who is losing how much money at Peno Rose's Sky Hi Club. Right here in this hospital people are dying. Ask old Thousand Cuts," I went on, nodding to the scalpel surgeon. "We just pulled one out of the fire. When does this come in second best to saving the skin of some tinhorn gambler?"

"Your Lodge obligations come first," he said quietly. "We have a replacement for you here. Here's your ticket for Lake Tahoe," he added, holding out an envelope from a travel agency.

"I'm staying here, Maragon," I said. "I'm a TK surgeon. I'm all through tipping dice."

"You may not find it practical," he said, getting up to leave.

Well, I hadn't. Three snakes inside my head had made me a sucker for the real one on my arm. Maragon had made his point. I might have reached the thirty-third degree. but I wasn't quite as big a shot as I thought I was. I could feel that rattler on my arm all the way to Lake Tahoe.

Like any gambling house, the Sky Hi Club was a trap. Peno had tried to kid the public with a classy *decor.* It was a darned good copy of a nineteenth century ranch house. At the gambling tables everything was free —the liquor, the *hors d'oeuvres,* the entertainment. Everything, that is, but the gambling and the women. The

casino was taking its cut. And the women—or should I be so sure?

You paid for your drinks if you stood up to the long mahogany bar. I turned my back to the rattle of cocktail shakers and chink of glasses, one heel hooked over the replica brass rail, and took a long careful look at the crap tables. There was a job for me at one of them. I began to shut out the distractions of sight and sound. I wanted nothing to dull my PSI powers.

A blond bombshell slithered down the bar and ground herself against my leg. "Wanna buy me a drink, honey?" she gasped. I smuggled a lift and slipped all four of her garters off the tops of her hose. A funny, stricken look replaced the erotic face she had made at me. She headed for dry dock.

B-girls usually work in pairs, so I looked down toward the other end of the polished mahogany. Sure enough, there was the brunette, frowning as she tried to figure why the blond bomber had high-tailed it out of there. I shook my head at her and she let it lie.

That should have cut out the last distraction. But no, I could see one more bimbo working her way through the laughing, drink-flushed crowd toward me. She had hair-colored hair, which was sort of out of character for a barroom hustler. I put plenty of TK on the heel of her right slipper, and she stepped right out of it. It might as well have been nailed to the floor. Nothing was going to discourage this one, I saw. I let her pick it off the floor, squeeze it back on her skinny foot, and come toward me.

This new babe leaned over toward me and stuck her nose up against mine. It was long, thin, and not a little red.

"Billy Joe!" she said, and sniffled loudly. "My darlin' Billy!"

How near-sighted can you get? I don't think there's such a thing as a case of mistaken identity around a guy like me. I didn't know her darlin' Billy from Adam's ox. But I'd have bet a pretty we didn't look alike.

"You're wasting it," I told her, looking out over the crap tables. "It's new, and different. But I'm not *anybody's* darling." A jerk of my head told her to move on.

But she sniffled and stayed put. I gave up and started through the press of gamblers toward the Cashier's cage.

"Billy Joe!" this hustler moaned behind me, clawing at my jacket. "I knew I'd find you here. And I came sich a fer piece, Billy Joe! Don't make me go off again, darlin' Billy!"

While I prefer to gamble for cash, I had reason while on a job for sticking to a known amount of chips. She stood there while I got a thousand dollars worth of ten-buck markers, looking at me with some kind of plea in her eyes. This again was not in the pattern. Most hustlers can't keep their eyes off your chips.

She puppy-dogged behind me to the crap table I had decided needed my attention. It was crowded, but

there's always room for one more sucker. And still one more, for the sniffly girl with the hair-colored hair pressed in against my useless right arm when I elbowed my way in between the gamblers, directly across from the dealers.

"Billy Joe!" she said, just loud enough to hear over the chanting of the dealers and the excited chatter of the dice players. Billy Joe! What a corn-ball routine!

I took stock before beginning to lose my stack of chips. There were more than twenty gamblers of both sexes pressed up against the green baize of the crap layout. Three stickmen in black aprons that marked them for dealers were working on the other side of the table. We had at least one dealer too many for the crowd. That screamed out loud the table was having trouble. Big gambling layouts know within minutes if a table is not making its vigorish. A Nevada crap layout, with moderately heavy play, should make six per cent of the amount gambled on every roll. That's its vigorish—its percentage. If the take falls below that, the suspicion is that the table is being taken to the cleaners by a crooked gambler, or "cross-roader." The table I had picked was the only one in the Sky Hi Club's casino with more than one stick-man working it.

The girl sniffled, and her long skinny arm reached around behind me to snag a couple sandwiches the

size of postage stamps from a waiter's tray. She wolfed them down, wiping at the end of her long nose with a wadded-up hunk of cambric. She'd done it before, and plenty, for her nose was red and sore. She made cow-eyes at me.

"Don't say it," I told her. "I'm not your darlin' Billy."

The dice were to my right—I'd get them after a couple more losers rolled. My unwanted hustler stood on that side of me, too. They never have any money of their own. I wasn't about to give her any of mine.

I wanted to lose some dough in a hurry. I started playing field numbers, and TK'd the dice away from the field every time a gambler came out. Of course, I could have let the table's six per cent vigorish take it away from me, but that would have taken longer.

Even with losing on every roll, the dice got around to me before I had lost the nine hundred I had set out to drop. I put four chips on the "Don't Pass" side of the line, shook left-handed because of my weak right arm, and got ready to come out. Sniffles seized me. "Don't Billy Joe!" she said suddenly. "You'll lose!" She pushed my chips across the line to the "Pass" side. That burned me up.

"Get your hands off my chips," I said, annoyed by bad gambling manners. Her face was all resignation and sadness. Well, not quite all. A lot of it was thin, red nose and buck teeth.

"You'll lose, darlin' Billy," she said.

"Pull those chips back!" I said. Her eyebrows shrugged, but she did as I told her. I came out, and tipped the dice to eleven. I kept the dice, but lost my chips, which is what I wanted. Throwing six more down on the "Don't Pass" side, I rattled the ivories in my left hand. Tears began to roll down her unhealthy cheeks.

"Lose!" she cried nasally, and sniffled. "Billy Joe! Listen to me, darlin' Billy! You'll lose!" Her eyes rolled up toward the top of her head as I ignored her and came out. Sniffles gasped, "Hit's a seven!"

Well, that's the number I'd tipped them to, but she called it before the dice stopped rolling. That left me thirteen chips. Half absent-mindedly, I put three of them on the "Pass" side of the line and tipped the dice to twelve. Mostly I was looking at this scarecrow beside me.

"Box cars!" one of the dealers called. "My future home." But he wasn't as quick as Sniffles. She had called the turn before the galloping dominoes had bounced from the backrail.

The box cars cost me the dice. The next gambler blew on them, cursed, and rolled. I didn't bet, and spent the next couple rolls looking at her.

The girl was a mess. Some women have no style because they don't even know what it means. Courturiers have taught them all to be lean and hungry-looking. This chicken was underfed in a way that wasn't stylish. They call it malnutrition. Her strapless gown didn't fit her, nor anybody within twenty pounds of her weight.

She was all shoulder blades and collarbones. I suppose that a decent walk would have given her *some* charm—most of these hustlers have a regular Swiss Movement. But this thing had a gait that tied in with the slack way her skirt hung across her pelvic bones and hollered "White Trash!" at you.

I wasn't much flattered that she had tried to pick me up. People have a pretty accurate way of measuring their social station. And she thought she was what I'd go for. Well, I guess I don't look like so much, either. I'd missed my share of meals when they might have put some height on me. My long, freckled face ends in a chin as sharp and pointed as her nose. And there's always something about a cripple, even if my powerless right arm doesn't exactly show.

My days on the Crap Patrol came back to me. That's where the Lodge had found me, down on my knees in an alley, making the spots come up my way without even knowing I could do it. And when they'd convinced me I was really a TK, and started me on the training that finally led to the Thirty-third degree, they'd put me right back in those alleys, and cheap hotel rooms, watching for some other unknowing TK tipping the dice his way.

Did Sniffles have it? She wasn't tipping dice, exactly, but she sure was calling the turn. She was tall, as well as skinny, and our eyes weren't far apart. "Billy Joe," she whispered above the racket of the gamblers in the casino, putting her mouth close to my ear. "I told you, sugar. And now you lost. You lost!" Her perfume was cheap, but generous, and pretty well covered up her need for a bath.

"There's some left," I told her. "Show me how." She hugged my arm to her skinniness. That's all any of the hustlers ever want—to get their hands on your chips. They figure some of them will stick to their fingers.

The gambler next to me had won a dollar bet without my help. He acted mighty glad for a win—maybe it was a while since he'd hit it. I decided to give him a run of luck.

Now in charge of my chips, Sniffles called the turn on every roll. She was hot. It wasn't just that she followed where the gambler next to me put his dough—she was ahead of him on pushing out the chips on half the rolls.

He quickly saw that my chips had stayed on the same side of the line each roll as his. He cursed me for a good luck mascot. "Stick with me, Lefty," he said. "We'll break the table!" I rammed a hard lift under his heart, and then, ashamed of myself, quit it. He turned pale before I took it off him.

"What's the matter?" I asked him, supporting his sagging elbow, still mad at myself for acting so childish.

"Nothing, nothing," he gasped, starting to recover. He'd only been dying, that's all. But it came in

second-best compared to holding the dice.

No point calling too much attention to him. I decided four passes were enough while he held the dice. What do you know, as he came out for the fifth time, Sniffles pulled my stack of chips to the "Don't Pass" side of the line, while scraping at the chapped end of her skinny nose with the back of her free hand.

Like every compulsive gambler I've ever seen, the roller next to me was sure he was on a rampage. Four passes and he thought he had the dice licked. "Ride with me!" he yelled at Sniffles, who plainly had the management of my chips.

"No moah," she said. "You'll lose."

Of course he did. I TK'd the one-two up. "Little Joe from Kokomo," one of the stick-men called. They raked losing bets and paid winners with the speed of prestidigitators. "Roller keeps the dice," the stick-man told my neighbor.

The gambler cursed and threw the dice to the roller on his left. He spat blame at Sniffles for not riding with him. He was one big clot of crushed misery. After all, hadn't he *wanted* to lose? They all do. I couldn't get very upset over his curses. So far he had lost one buck, net. And he'd had some action. So much for gamblers.

I kept control of the dice while each new gambler handled them. I was having a good night. Of course, by that time I had handled the dice, which always improves my TK grip. Every point I had TK'd came up. For all the perception I kept on the ivories, I could sense no other TK force at work, which after all was the whole reason for my gambling.

The interesting note was the way Sniffles handled my chips. Sometimes more sure than others, she occasionally let a winning stack ride. On other rolls, she keened and chanted oddly to herself, eyes closed, and pinched down most of the stock. But she was never on the wrong side of the "Pass" line. I kept track, not wanting my stack to build up past the thousand with which I had started. Most of all, I watched the skinny gal dope the dice, sniffle and wipe the end of her nose. She was one homely sharecropper, that was a fact, but she had a nice feel for Lady Luck. Or for what I planned next.

Wanting to come out with an even thousand, I adjusted the size of her last bet. When I won it, I pulled my chips off the tabe, which Sniffles didn't resist. She used the lull to grab a handful of sandwiches from another waiter's tray. A gambler at the far end of the table came out, calling loudly to the dice. The cubes made the length of the table, bounced off the rail and came to a stop dead center, between me and the three stick-men in the black aprons. That's the instant when every eye is on the dice, trying to read the spots. And that's when the dice jumped straight up off the baize, a good six-inch hop into the air, and came down Snake

Eyes, the old signal. Wow! I'd had it!

"TK!" somebody yelled. He might as well have screamed, "Fire!" the way that mob of gamblers scuttled away from the table.

"No dice," one of the dealers said automatically. He raked the hopping cubes sadly to him with his hoe-shaped dice-stick.

I made a break for it with the rest of the crowd, trying to keep my eye on Sniffles. But she had the sure-loser's touch of slipping away from any authority. She vanished into the milling mob. My last glimpse had been of a skinny arm reaching up to pluck some more free *hors d'oeuvres* from a tray as she fled.

I should have saved myself the trouble. They had a bouncer on each of my elbows before I had moved five feet. They carried more than dragged me into a private dining room behind the bar. It went along with the ersatz rustic *decor* of the rest of the Sky Hi Club. There was sawdust on the genuine wood floor, big brass spittoons and a life-sized oil-color of a reclining nude, done with meaty attention to detail, behind a small mahogany topped bar. Stacks of clean glasses vied for space with labeled bottles on the back-bar.

One of the stick-men followed us into the room, taking his apron off as he closed the door behind him, shutting out the roaring clatter of the casino. "Cross-roader!" he hissed at me. I should have known what was coming, but I missed it. He slapped me hard across the face, saving his knuckles, but not doing my jaw a whole lot of good. I would have fallen clean over, but the bouncers were still tight on my ebows.

"Wait!" I tried to say, but he cuffed me with the other hand, harder, if that were possible. This is the moment when you have to stop and think. A Blackout is quite effective —it's hard to hit what you can't see. And there's something mighty unnerving about being stricken suddenly blind.

Oh, face it, I suppose the real reason I felt for the arteries supplying blood to his retinas was that so few TK's can do it. I clamped down tight, and his lights went out. He cried out in fright, and both hands came groping up in front of him, his fingers trembling.

"I'm blind!" he said, not able to believe it. He began to lose his balance.

I felt one of the bouncers go for his sap. "Try it, you gorilla," I told him, wrenching around, now that I was free on his side. "Try it and I'll rip the retinas off your eyeballs the way you'd skin a peach!" He recoiled as though I were a Puff Adder. The other bouncer let go of me, too. I skidded in the slippery sawdust, scared half to death, but got my back against a wall just as the stick-man who had slugged me lost his orientation completely and fell to his knees in the sawdust. It would be some minutes before his vision started dribbling back.

The click of the door latch broke

the silence. One of the other stick-men eased himself in, holding the door only wide enough to squeeze past the jamb. Don't give the suckers a peek at the seamy side. They might just take their money to the next clip joint down the street.

He didn't look like the others, somehow. He was older, for one thing. Perhaps it was his nearly bald scalp, perhaps the thick, bookish glasses in heavy brown frames. "What's that?" he asked mildly, poking a finger at the dealer kneeling in the sawdust on the floor. My Blackout victim was reaching out, trying to find something he could use to raise himself to his feet. His face was frozen in a fierce, unseeing stare as he mentally screamed at his eyes to see, see, see!

"Blackout!" one of the bouncers told the second stick-man in a muffled voice.

Sharp eyes fired a quick, surprised look at me. "Well," said the bald dealer. "Good evening, Brother." I had a surge of relief. The strong-arm stuff was over. This was the casino's TK.

"What kept you, Brother?" I said, sounding a little sore. "These characters were going to kick my teeth out."

His grin had a taste of viciousness. "I did give them a little time," he agreed. "How was I to know?" He looked calmly at them over the tops of his glasses. "You can go now," he said, like a schoolmarm dismissing class.

The gorillas helped the blindly staring dealer to his feet, brushing at the sawdust that clung to his clothing, and had him presentable by the time they led him through the door. They seemed glad to get away.

"The Blackout," the TK said musingly to me. "You hear about it, and the Psiless cringe when they think it might happen to them. But you don't see it every day. You're in the Lodge, of course?" he added.

"Of course," I said coldly.

"Please," he said, waving a hand at me. "Don't take it so big. So am I." From five feet apart we exchanged the grip, the tactile password impossible for the Psiless to duplicate—just a light tug at each other's ear lobes, but perfect identification as TK'S. "I'm Fowler Smythe," he said. "Twenty-fifth degree," he added, flexing his TK muscles. "What is it, buster? You on Crap Patrol?"

I paused before I answered. Twenty-fifth degree? Since when could a gambling casino afford a full-time Twenty-fifth? TK's in the upper degrees come high. I had already figured my fee at a hundred thousand a day, if I straightened out the casino's losses to the cross-roader.

"Wally Bupp," I said at last, deciding there was no point to trying some cover identity. My gimpy right wing was a dead giveway. "Thirty-*third* degree," I added.

He had a crooked grin, out of place beneath his scholarly glasses. "I've heard of Wally Bupp," he admitted. Well, he should have. There aren't so many Thirty-thirds hanging

around. "And you are young, smug and snotty enough to play the part," he concluded without heat. "Still, that's all it might be, just play-acting, with Barney going through the motions of being blind. You could be outside the Lodge, sonny. Any cross-roader who can tip dice the way you were working them can twitch an ear. Let's see some credentials."

He scuffed through the sawdust to the bar and took a stack of silver dollars from his apron. He held them, dealerwise, in the palm of his hand, with his fingertips down, so that they were a column surrounded by a fence of fingers.

"How many?" he asked.

I shrugged. "The whole stack, Smythe," I told him. His eyebrows went halfway up his tall, tall forehead. But he put them all down on the bar top, about twenty-five silver dollars. "Show me," I said.

He ran his fingertips down the side of the stack of silver. Another tactile. Well, he certainly wasn't much of a perceptive, or he would have been able to handle the Blackout himself. He closed his eyes for the hard lift. Some do that. The coins came up off the mahogany an inch or so, and made a solid smack when the lift broke and he dropped them back. Not very impressive work for a Twenty-fifth degree. The coins spilled over.

I used the excuse of straightening up the stack to get a touch, myself. I could have done it visually, of course, or I could have straightened them up with TK, but touch helps my grip. I took a good look at the door to the main casino, a heavy job of varnished native cedar. Just to show him, I turned my back on the bar, leaning against it with one foot on the brass rail. The lift was as clean as I've ever managed. Anger, fear, any strong emotion, is a big help. They came up all together, staying in a stack, and I could perceive that they hung in the air behind me, a good foot clear of the bar, and about twenty feet from the door to the casino. In a smug show of control, I dealt the cartwheels off the top of the stack, one at a time, and fired them hard. Each one snapped away from the hovering stack, like a thrown discus. My perception was of the best. Each coin knifed into the soft cedar of the door, burying itself about halfway. My best sustained lift, I suppose is about two hundred times the weight of a silver dollar. But with the lift split by the need to keep the stack together, about twenty gees was all the shove I gave the cartwheels. Still, you might figure out how fast those cartwheels were traveling after moving twenty feet across the bar at an acceleration of twenty gees.

Smythe gasped. I doubted he had ever seen better, even in the controlled conditions of Lodge Meeting. "A little something to remember me by," I said, as I opened the silver-studded door. "Now let's see the boss."

"You're a TK bruiser," he said,

impressed. "If you hit Barney's eyes like that, he's a Blind Tom for fair."

"Hardly," I sniffed. "You ought to know that no respectable TK would lay a lift on a retina. I just squeezed off a couple of small arteries. He's back in business already, I'd say."

Had I mentioned the rustic *decor* of the Sky Hi Club? When Las Vegas had deteriorated to the point where it would turn most stomachs, the better clubs migrated up among the tall pines, along the shores of Lake Tahoe. And in place of the dated chromium glitter of Vegas, they had reached way back to the "Good old days" for styling. The Sky Hi Club was typical. The outside was all hand-hewn logs. The inside had a low, rough-beamed ceiling, and a sure-enough genuine wood floor. The planks were random-width, treenailed to the joists. Even the help was dressed up like a lot of cow-pokes, whatever cow-pokes were.

This ersatz ranch-house was owned by two completely unlovelies. Peno Rose, who had used his political leverage to get me on the job, I had known since he'd been a policy number runner on the lower East Side. His partner, Simonetti, was something else, but somehow I wasn't looking forward to meeting him any more than I was to seeing Rose again.

I guess it's the filth within these croupier types that makes them surround themselves with the aseptic immaculacy of iridium and glass.

Their office was in a penthouse perched on the slanting roof shakes of the casino. It was big as a squash court, and as high and as square. Every wall was glass. It couldn't have been in greater contrast to the contrived hominess of the casino if they'd thought about it for a year. Then, for the last twist, the furnishings were straight out of the old Southwest—Navajo rugs, heavy, Spanish oak desks, and a pair of matching couches or divans of whole steer leather stretched over oak frames.

Peno Rose came quickly toward me the moment Fowler Smythe showed me into the office, spurs jingling. "Hey! There he is! The boy they had to rule off the track! How's a boy, Lefty? Long time no see." He had his hand stuck way out ahead of him. His sharp, dried-out features repelled me twice as much as they had ten years before. That hatchet face of his was gashed with what he thought was a smile. I've seen sharks with a pleasanter gape. Naturally, I didn't take his hand.

"Hi, Peno," I said. He jerked his hand back and straightened up. He snapped the hole in his face shut.

"My partner," he said, waving his hand at the dark-skinned gent standing over against one of the fumed oak desks. "Sime, meet Lefty Bupp, the hottest TK artist with dice in the whole damned country!"

Simonetti leaned against the desk. He drew a zipper open in his fancy blouse, dragged out the Bull Durham and started to roll his own. They watch too much TV. It makes terrible hams of them all. He spat on the floor.

"A living doll," I said. I took a better look at this honey. Face it, he was an oily snake, cleaned up as much as possible, but not enough. No amount of dude ranch duds, gold spurs or Indian jewelry could hide his stiletto mentality. He was just a Tenderloin hoodlum with some of the scum scraped off. Well, I should know. So was I.

Simonetti finished licking the seam of his roach. He came forward as he lit it and blew too much smoke in my face. "What you doing here?" he said in a husky voice. "I told Rose no dice. We need another TK like we need a hole in the head."

"You think I *want* to be in this trap?" I snapped at him. "Say the word, Tex, and I'm gone."

"You're fired," he said huskily. "Scram!"

I started for the door, glad to be rid of the lot of them. Peno Rose beat me to it. He showed me several rows of teeth, the way sharks will. "Half of this joint is mine," he snarled, holding a hand lightly against my chest. He knew me better than to push. "*My* half is hiring you."

The whiff of garlic over my shoulder told me that Simonetti had followed me, too. He didn't have any reservations about grabbing me and twisting me around and giving me a real face-full.

"If you know what's good for you, you'll get out of here."

"Freak?" I said, laying it on his mitral valve. After his heart had missed about eight beats, he started to sink, and I quit the lift. "Be polite, Simonetti," I said to the panic in his yellowish face. "Next time I'll pinch down tight. The coroner will call it heart failure. Tough."

He wanted his stiletto. He needed it. He was sorry he had ever quit carrying it. A couple seconds of reflection told him I was too tough for him. He went for his partner, his face darkening with rage now that his heart could get some blood to it. He had his hands out, for Rose's throat, I guess. For my dough it took guts to put fingers that close to all those teeth. But he never got a chance to try it. An ashtray, one of those things with a shot-loaded cloth bag under it, flew off a desk, smacked him in the back of the head, and dropped to the floor with a thump.

It wasn't a hard blow, but an upsetting one. Fowler Smythe grinned at him from where he was sitting in one of the leather divans. "Sit down and shut up, Sime," he suggested coolly.

Simonetti sagged with defeat. "Look, Rose," he gasped. "I want out. Bad enough that our losses can't be stopped by this creep Smythe. Now you drag in another TK. Buy me out!"

"What's a business worth that's losing its shirt?" Rose sneered. "We were in clover, you fool, till this cross-roader got to us. This is our only chance to get even."

That finished Simonetti. He went back to his desk and slumped against it, scowling at the points of his handtooled boots.

Rose looked over at me. "Let's make sense," he said quietly. "We watched you on the TV monitor from the time you came in."

"Sure," I said.

"What about it?" he demanded.

I shrugged. "I had my way with the dice, Peno. I dropped nine yards as fast as I could, then won it back. The spots came up for me every single roll but two, when I had my eye on something else."

He snickered. "We saw her," he said.

"How about it, Fowler?" I asked my Lodge Brother. "Was a worker tipping the dice tonight?"

"I never felt it," he said. "But the table had dropped nearly forty grand during the shift, which was about over when you started to play. He's too good for me, Wally."

"But you felt *my* lifts," I protested. "You called 'TK' on the table."

Smythe shrugged and took off his glasses. "I thought I felt you tipping when you first came to the layout," he said, waving them around. I nodded confirmation. "But it was smooth work, and I could hardly be sure. Most of these maverick TK's strong-arm the dice, and they skid across the layout with their spots up. You're way ahead of that—you don't touch them till the final few tumbles. And then, you were losing, and I couldn't see that the table was being hit."

"I thought it was the smart

move," I explained. "I was still controlling the dice, and if there'd been a cross-roader working, I should have felt him skidding them."

Smythe nodded. "Of course," he added. "I could feel you more clearly after you got the dice, and later, while that scarecrow with you was handling your chips. You were building a stack. So I fingered you."

"Careful," I said sourly. "You're talking about the woman I love."

There was a strained moment of silence, and then they all laughed. She'd been a sight, all right.

Simonetti came back alive with that one. His husky voice cut in on the laughter. "Where does that bag fit?" he demanded.

"No idea," I said truthfully. "A random factor. I don't think she fits."

"*Something* has to fit!" he yelled in his oversized whisper. "How about the way our losses follow Curley Smythe around from table to table?"

This was something. "The table you watch is the one that gets hit?" I asked Smythe.

He blushed, clear to the top of his bald head. "A subtle, nasty operator," he said gruffly. "And he's had the gall to stick it in me pretty badly, Wally. What Sime says is true."

Well, this we wouldn't stand for. I didn't give a care if every gambling house in Nevada went broke. But Smythe was in the Lodge. And it finally made sense that the Lodge had sent me to bail him out. I gave old Maragon my mental apology. The Grand Master wouldn't stand still for *anybody's* making a fool out out of the Lodge. Still: "Nobody that good is out of captivity," I snapped. "I don't believe it. It's not TK that's robbing you."

"Oh, ridiculous," Rose said, showing his teeth. "Gambling is our business, Lefty. Don't you think we could spot any of the ordinary kinds of cross-roading? This is TK, and it has real voltage. We can't spot it. We've got to have Psi power do it for us."

"Maybe," I agreed. "But no TK can do it if Smythe can't. Have you tried a PC?"

Simonetti grabbed a piece of the heavens in rage. "No!" he yelled in his loud whisper. "None of your crystal-ball witches in here!"

I knew how he felt. PC's give me the colly-wobbles, too.

"What's the matter with pre-cognition?" I asked him. "If this crook has got you stuck, Rose is right. Only Psi force will get you out of this jam. If you know in advance where this operator is going to hit you, you can nail him. There's a dozen techniques."

Peno Rose looked at me from under lowered brows. "Are *you* a PC, Lefty?" he asked me.

"No," I said shortly. The Lodge had proved that several times, in spite of my strong feelings that I had flashes of pre-cognition. Why should I resent not having PC? How many Psi personalities have more than one power? Not many. And as for pre-cognition, as Simonetti said, more than their fair share is pos-

sessed by wild-looking women. Like Sniffles, I thought suddenly.

"Well," Rose said, turning back to his partner. "Let Sime and me talk it over. Maybe we should get a PC."

"Nuts," Simonetti told him.

"I'll think it over, too," I said. "See you tomorrow." I turned to go. Simonetti and Smythe followed me out, each for his own reasons, I guess, leaving Rose behind in the cube of glass on the roof, looking like he was going to turn belly-up and take a bite out of the PBX on his desk.

I wasn't exactly shadowed, but I knew somebody had his eye on me as I wandered about the crowded casino, looking for Sniffles. As far as I could make out, she had vamoosed without trying to hustle another sucker. Her percentage of my winnings had certainly been a disappointment to her.

At last I went down the ersatz wooden steps into the neon-gashed night and started across the nearly deserted main drag toward the motel where I had registered. A powerful turbine howled as a car pulled away from the curb, perhaps a hundred yards up the way. His lights came on and snapped up to bright. I had a perfect flash of PC—I *do* have moments of it, no matter what the Lodge thinks. The car was going to take a dive into the fountain pool in front of my motel. But it sure didn't act like it. I froze in the middle of the road, hearing rubber scream as the driver floored the throttle and hurled the automobile right at me. He might as well have been on tracks. There was no place to go—I was in the middle of a six-lane boulevard, and could never make either curb before he ran me down.

This is when it pays to be a perceptive. I've talked to many TK's about how they visualize their lifts. We all conceive of it differently. With me a real strain is like shining a bright beam of light on the spot you're lifting.

Be glad, Wally Bupp, I had time to tell myself. Be glad for a mechanical mind. Where do you lift four thousand pounds of car aimed right at you? Well, there is a small valve, can't weigh half an ounce, lightly spring-loaded, that is in the power-steering mechanism. I seared a lift at it. You know what happened.

The feedback of the power-steering wrenched the wheel from the driver's hand—it was ten times as strong as he was, dragging its power as it did from a four-hundred horsepower shaft turning 30,000 rpm. The car careened and skidded across the curb. It took out a small marble rail around the fountain pool and dived in, still screaming rubber. The fountain went over with a crash and then the racket dwindled off in the shriek of twisted buckets. The turbine had gotten what for in the collision.

I didn't hang around to see what had happened to the driver. He was just some heavy who had the job of rubbing me out. But I did seek an-

(*Continued on page* 107)

THE SPACE-DRIVE PROBLEM

by JOHN W. CAMPBELL, JR.

The problem of Space—as any daily newspaper will clearly demonstrate—is NOT simply a technical problem. It's violently surcharged with emotional and political tensions.

IT MAY seem, at first thought, that the problem of a space drive is a purely technical problem. It seems clear enough that if we want a mechanism, or principle, by which a vehicle can be propelled in free space—a device not a rocket, but something acting on the level of force fields, that does not have to carry reaction-mass to throw away—this is a pure, physical-science problem.

It isn't. It's a violently emotional problem, first, a red-hot political

Norman Dean setting up the space-drive demonstration model.

problem second, and only incidentally a technical problem. Basically, the technical problem is the easiest of the three.

The reasoning behind that statement is quite simple; Nature invariably gives an exact correct and truthful answer to a properly phrased question, always without fear, prejudice, or dishonesty. The technical problem is simply that of asking Nature the right question.

The other two aspects of the problem do not have the same clear-cut simplicity. Both involve human emotions—which, as various philosophers have reported over the last six millennia of recorded history, are anything but clear-cut or simple.

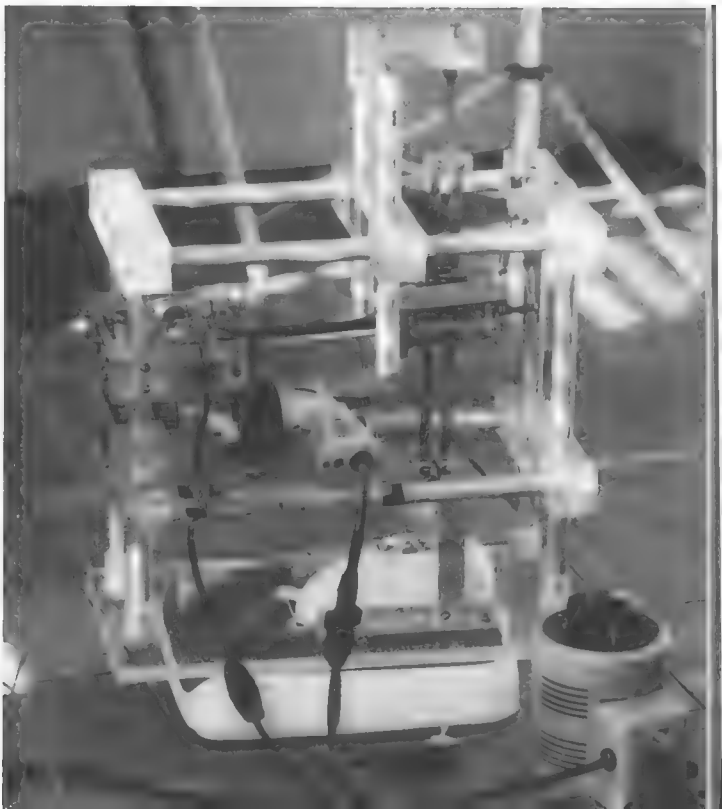
In the first place, the most honorable and ethical of men can be a bald-faced liar, if he's misinformed himself. Even a man so inhumanly honest as to be able to overcome completely any personal emotional bias can still be misinformed.

If you think that there is no emotional problem entailed in the space-drive problem . . . please think again, including more of the rele-

vant facts. Is it an unemotional problem to a man who has devoted fifteen years to rocket-engine research and development? To an executive who has been responsible for authorizing the expenditure of hundreds of millions of the national wealth on the development of launching-pad facilities? Take a careful look at the ads in any this-year's issue of such a magazine as *Scientific American* . . . with the thought in mind, "These men don't know it yet, but a true space drive has already been developed. All this research, all these proposals, are meaningless now."

Please note carefully: it is not necessary that a space drive *has* been developed for you to try that little test. Just assume that you did know that one had; the point of that suggested test is to appreciate that the introduction of any true space drive is a red-hot emotional problem.

The buggy-whip manufacturers didn't believe, when the Model T Ford appeared, that their industry was finished. The fact dawned on them only slowly. But gradually they did come to realize that there was no possible improvement in buggy-whip design that could, by brilliant superiority, regain the dwindling mar-



The Dean Drive demonstration model. The wire to the left supplies battery current to operate the solenoid-clutch; a variable transformer gives speed control of the standard one-quarter inch drill motor.

ket. It wasn't a matter of competition with their product; it was the horse—without which buggy whips had no meaning—that was innately incompetent to compete.

There is no possible brilliant improvement in rocket design that can make it competitive with a true space drive. The fact is perfectly, and unarguably clear to any rocket engineer. Unlike the buggy-whip manufacturer, who only slowly came to realize that his industry no longer existed, the rocket engineer can see at once that rockets are reduced to a very small-time, hobby or special-effects business. If you want to drill a hole a few inches in diameter through one hundred feet of hard rock, a rocket—double-ended type—is far and away the simplest, cheapest, most portable and quickest technique.

But the space rockets are out completely, if a space drive of any kind is invented.

Of course rocket engineers don't constitute a very great faction in the population—even in the population of Science. Now I have been told, many times, by many people, frequently with considerable heat, that there is no such thing as "Science"; there are only human scientists. I don't entirely agree—but we can all agree that there are human scientists. With the specific recognition that there may be Martian scientists, Rigellian scientists, and even Eddorian scientists, for all we know—but the only kind of scientists so far encountered are *human* scientists. They start out as men, not computing machines, and they remain men with a scientific training.

They, too, have emotional problems, biases, prejudices, and powerful desires.

I was asked, recently, to talk to one session of a seminar series at one of the major technical schools. The series was held at night; it's for professionally employed scientists and engineers who are working toward higher degrees. The group is made up largely of chemical engineers; the overall theme is an effort to study the technique of solving problems, rather than education in any specific field.

I was to send in two questions-problems for the men to work on; their answers were sent to me to be graded and returned the evening I participated.

The second of the two questions was:

An inventor has patented a device that converts rotary motion to unidirectional motion. And he means just that: *uni*directional motion. If driven by a motor, this device produces one-way thrust. It is a bootstraps' lifter. A sky hook with elevator attachment. It makes a monkey's uncle out of Newton's law of action and reaction.

Now: assume for discussion that the device actually does work. (Laws of science have been overthrown before—even old, established ones!) Many other fundamental principles of modern theory would necessarily

change with the fall of the law of action and reaction. What other consequences to fundamental scientific theory would be implied?

One of the answers came from a chemical engineer working in one of the major oil refineries in the New York Metropolitan area. His reaction was:

Answer:

"The most bitter consequence, if this invention was possible and did work, is this would be a hell of a place to live. The basic laws of centrifugal and centripetal action would not hold. There would be no method of predicting the path of planets through the Universe, or of a rocket ship. The laws of fluid flow or mechanical work would not hold. In essence, this is the reason why I do not read science fiction. Scientific curiosity and fantastic experimentation should be encouraged, but pure fiction . . . This statement was probably made about the work of Leonardo da Vinci and Jules Verne, who were forward-looking men of high caliber, but they stayed within the limits of reason. This problem exceeds reason."

So far as he knew, the question was purely hypothetical; that I had in mind a specific invention he did not know. His reaction was, clearly, emotional, not technical. The emotion stems from the fact that the proposed device attacks one of the fundamental tenets of his world-picture.

Who wants a true space drive, then? Not the rocket engineers! And not the scientists in general—not when it means the destruction of the foundations of their science. If one can't rely on the eternal validity of Newton's Laws of Motion . . . what stability is there in the world of Science? It's not just a space drive; it's a thing that casts doubt on the validity of the laws of fluid flow, the conservation of energy, the laws of thermodynamics—on everything!

"Better the Devil we know, than the Devil we know not of!"

The space drive is an emotional problem of the highest order, to anyone who has a major emotional investment in *any* field of science.

Because to be a space drive—not antigravity, which isn't a drive, but simply something that takes off the parking brake, so to speak—the device must, in some fashion, negate the Newtonian laws of motion. It can't drive in space without drastically rearranging the Law of Conservation of Momentum, and the law of action-and-reaction. And anything that leaks through the Law of Conservation of Momentum automatically challenges the Law of Conservation of Energy. The laws of thermodynamics are based solidly on those; invalidate, or even seriously challenge them, and thermodynamics is a structure without a foundation.

Relativity is based solidly on the conservation of momentum, mass-energy, and electric charge. Any true space drive throws two of the three into doubt.

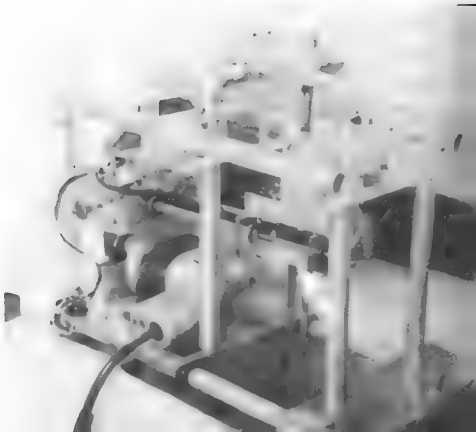
This is something to make a scientist feel happy and contented?

Arrow on the left marks the commutator mechanism; arrow on the right indicates one of the two ten-ounce brass masses.

"Look, who the hell wants that damn space drive, anyway?!"

The political aspects of the problem are more readily stated and accepted as realities. It's not easy for the intellectual man, who believes very sincerely, that his life is entirely rational, to accept or appreciate that he remains a *human* scientist, and that his reactions are emotional. The politician is different; his business, like that of the dramatist, is largely emotional. He *knows* he has emotional problems—and that only a part of those emotional problems are his own. It's perfectly true that schools that flunk out the incompetent, and give special encouragement to the unusually able, are going to do a better job for the nation—but any politician knows the emotional dynamite lying inside that proposition. It isn't his emotion—but it's his to deal with, whether he likes it or not.

A true space drive, just at this point in history, is international political dynamite. Several nations, now, have weapons too powerful for use on Earth; if one of those nations, and only one, also had a drive that gave them free, full, economically practical access to the entire Solar System—the concept of "massive retaliation" would be invalidated. If nation Alpha has a true space drive, one that can move ten thousand ton space-liners from Earth to Mars in three days—five days if Mars is on the far side of the Sun—or reach the Asteroids in five days, while nation Beta can't get so much as one man-carrying vehicle into orbit . . . Beta can't talk about "massive re-



Arrow marks one of the two contra-rotating masses; the second is parallel, obscured by aluminum-tube support.

taliation" as a deterrent any more.

Do you think any sane politician would want a true space drive developed in the laboratories of his country? If the scientists of Alpha develop it, it's practically certain that before a full-scale use of it could be begun, the intelligence agents of Beta would know *about* it, even if security were so tight that they couldn't know *it*.

And quite clearly no sane politician would dare suggest that the Great Secret was too hot to keep a secret—suggest that it be freely shared with Beta.

"Look, dammitall—who wants this space drive now, of all times?!"

It's fairly probable that, if Beta found that Alpha had a true space drive, the Betans would figure their only remaining hope was to force Alpha to her knees before the space drive was developed into use.

Sometimes, somehow, a magnificent ineptitude can solve problems that no wisdom could touch.

I believe the true space drive has been discovered, tested in models, and patented. It's the most colossal breach of national security I can imagine, just offhand; a true space drive is the well-oiled key to the entire Solar System—cheap, quick, and practical. If Fermi & Company had, in 1941, gotten a United States Patent, published by the Government Printing Office, detailing precisely how to purify U-235, how to manufacture Plutonium, and how to make an atomic bomb, it wouldn't have been a security breach of the same order. After all, as the Air Force pointed out in 1946, the fire raids on Tokyo did more actual damage than the Hiroshima and Nagasaki bombs. Nuclear power is still more expensive than coal. The atomic devices didn't actually do anything we couldn't achieve, though in a harder way, without them.

A space drive does things we can't achieve at all any other way. No rocket can carry reaction-mass enough to maintain a one-gee acceleration all the way from here to Mars—or from here to Neptune. Lack of reaction-mass makes it effectively impossible for a rocket to do more than the minutest maneuvers in space. A rocket's course is about as flexible as a glass rod; it can be bent a little, of course.

Under the concept of national security, publication of the detailed mechanism of a true space drive constitutes an absolutely intolerable breach of secrecy.

Fortunately, magnificent bumbling, combined with emotional rejection of the ideas, have led to the publication and open distribution of the principle.

Frankly, I think that we are most incredibly fortunate; it would have been suicidal for anyone to suggest releasing such a discovery if it had ever gotten under Security—and almost equally suicidal, I suspect, to try to keep it secret.

Can you imagine anyone proposing to give away the Solar System—a *usable* Solar System, when there is a true space drive!—if it were clear-

ly recognized that the invention was precisely that; the key to the full utilization, to the ownership-in-fee-simple, of the Solar System?

Now it's happened by bumbling and resistance, of course, there can be screaming, wailing, and explosive accusations . . . but the critical danger point is passed; it isn't a secret.

It wasn't, however, by wise intent that it was released; it was *not* high-order statesmanship that saved the situation.

The story, in essence, is this:

In the summer of 1956—over a year before Sputnik I took off—Mr. Norman L. Dean, of Washington, D. C., applied for a patent on a device for converting rotary motion to unidirectional motion.

He tried, naturally enough, to interest various government agencies in his discovery. He was still trying in July, 1959, when the patent was finally granted, and the United States Government Printing Office made it available to anyone with twenty-five cents and a desire to see it. Dean had also, naturally, applied for British and German patents by that time.

To get from almost any Government building to Mr. Dean's residence is a fifty cents taxi ride. Mr. Dean has a working demonstrator model at his home; it's been there while various and sundry government agencies busily didn't look at it.

I drove down from the New York area to take a look; the accompanying photographs show what I saw.

Please consider carefully the following point; it's crucially important, and anyone seeking to evaluate the point of this article misses the thing entirely if he does not bear this in mind:

1. The foregoing statements about the emotional and political consequences of a space drive are valid, *whether Dean's device is such a drive or not.*

2. The failure of any government agent, of any bureau, to inspect the working model, or allow a demonstration of the model, remains a violation of the fundamental doctrine of Science, *whether the device works or not.*

It is my present belief that Norman Dean has made a major breakthrough discovery; that's a personal opinion, based on observational data, which is more than the government scientists have to back their contrary opinion, but remains an opinion of one individual.

But that no government agency either accepted a demonstration, or bothered to inspect the device, until after the patent was published, and it had been discussed in the December, 1959 editorial, is not opinion. It's checkable fact.

The thing Galileo fought for—the thing for which Science has honored him, classified him as a martyr of Science—was the fundamental proposition that demonstration must be accepted; that observational data must never be suppressed for the sake of Authority and Theory.

The scientists of the National Aeronautics and Space Administration specifically violated that fundamental for which Galileo fought. They wouldn't look.

Neither would the Office of Naval Research.

Neither did anyone from the Senate Space Committee. Which is perhaps more remarkable; a Senate Committee that rejected an opportunity to investigate something!

Who is Norman L. Dean?

Well, the really important thing is that he's a Mr., not a Dr.; he doesn't even have a bachelor's degree in science. Obviously incapable of doing any useful scientific thinking. No need to investigate *his* ideas.

The fact that he is, professionally, a major executive in the Federal Housing Administration, specializing in mortgage appraisal, indicates that he can, however, do some very cogent thinking indeed.

But in his machine, he is a hobbyist at work—an amateur. He's so much of an amateur that, unlike the professional, he could, and did, challenge the fundamental assumptions of physics. Being an amateur, he does not have any appreciable emotional investment in the validity of Newton's Laws; he had no block against challenging them.

His device—the patent number is 2,886,976 and you can get it from the United States Government Printing Office for twenty-five cents—will, when driven by a rotating shaft, produce a thrust without an equal and opposite reaction.

His demonstration model is specifically designed to be just that—a demonstration model. It's not made for maximum efficiency, lightness, compactness, or beauty; it's designed to be a completely open-work unit, in which every component and operation is clearly visible.

It does *not* lift itself; it isn't intended to.

At this time, he has no operable models that do lift themselves; he has photographs of models that did. In measuring engineering performance factors, to get necessary engineering data, these models had to be tested to destruction—and were.

Mr. Dean's primary education and experience have been in business; he, with that orientation, is not particularly interested in the space drive feature. A device capable of producing force without reaction has several million work-a-day, down-on-Earth uses; the heavy-industry use of the Dean drive will be on Earth. Space applications will be, so far as the economics of the matter go, a minor side line.

X rays, electronics, cyclotrons and electron microscopy all stemmed from Faraday's development of the generator, the transformer, and the motor. They have been the great new-fields applications of electric power.

Radio, television and radar—these are new and wonderful things. But what keeps the power-house generators spinning is the heavy horsepower demands of industrial appli-

cations like electric heating, driving machine tools, and doing similar jobs that fire or steam power could do . . . but not as well or as conveniently. It's not the new-and-glamorous that uses the megawatt hours; the biggest broadcasting station throws out only about as much power as is used in a domestic electric system. Fifty thousand watts sounds big; my home draws 125 amperes at 230 volts on occasion, and that's 28,750 watts.

The heavy-duty use of the Dean drive, as Dean is businessman enough to recognize, is not in glamorous space-exploration—however important that may be in human history—but in the slugging, heavy, hard work of the world; simply lifting things that have to be moved; for industrial material-handling devices.

The gadget that can drive a spaceship will be more often needed to lift a massive steel girder into place. With a Dean drive unit on the end of a fishpole-like control rod, a man could lead a 100-ton bridge-girder into place.

If you've used an ordinary one-quarter-inch electric drill at all, you have probably run into the problem that the drill was willing to work—but you couldn't, because of the location, put enough pressure on the bit to make it cut. It's easy enough to make a motor and chuck capable of turning a two-inch drill bit . . but how, with a portable unit, can you apply the sort of pressure it takes to make such a device bite into a steel girder?

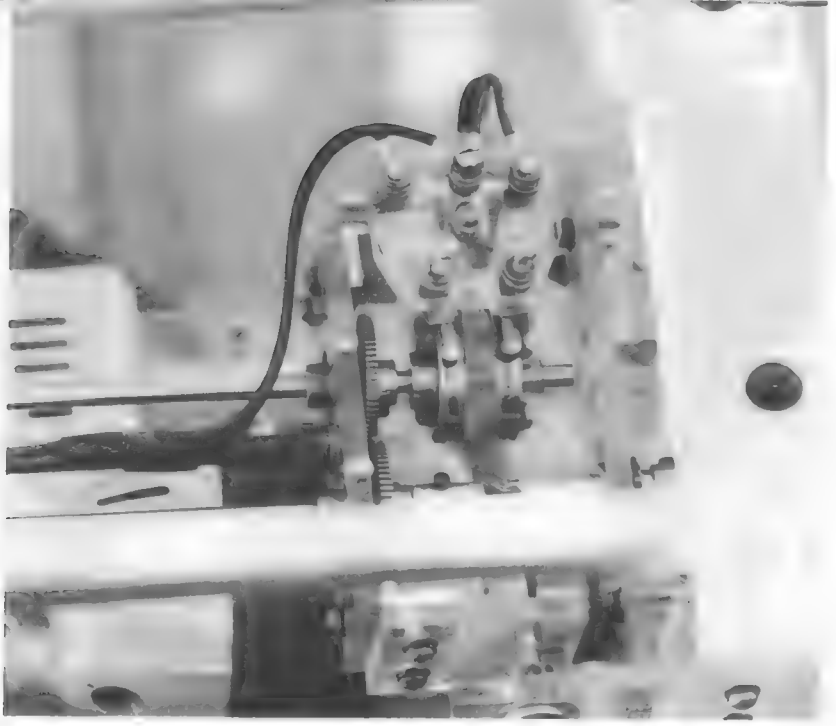
The Dean drive is simply a device that generates a one-way force; it lifts if you point up, but it pushes in any desired direction, without need of something to take the reaction force. There isn't any.

Dean's engineering data indicated that, neglecting friction losses—which are simply a matter of design, not principle, and therefore highly variable—a 150 horsepower engine could develop a 6,000 pound thrust.

My automobile has approximately 400 horsepower, and weighs approximately 5,800 pounds. Allowing a fifty per cent loss due to mechanical friction, that means that the car could be equipped with a Dean drive, and come up with an acceleration of one gee. The passengers would need not seat-belts, but a strapped-in cocoon. The one-gee acceleration would mean going from rest to about sixty-five miles an hour in three seconds flat . . and it would, of course, mean braking action that would stop the car, on the slickest of glare ice, in the same three seconds, in a distance of about one hundred and fifty feet. If the passengers weren't cocooned into place, they'd need hospitalization, however.

By comparison; the maximum possible acceleration with rubber tires on dry concrete is about 0.2 gee; the maximum braking is about 0.4 gee. That's simply the coefficient of friction of rubber on concrete.

Obviously, the device would also allow airplanes to leave their wings behind; a true hovering machine



Commutator mechanism of the Dean Drive demonstrator.

capable of Mach 10 is perfectly feasible.

These, not the space applications, will be the really major applications of the device. We've been needing a portable sky hook for centuries; it looks like Dean has one.

Dean's demonstration model is intended to show the principle; that a pair of counter-rotating eccentric masses can, in his system, generate a non-reactive force. The simplest way of demonstrating it is to show that some of the weight of his machine goes . . . somewhere . . . when it's turned on. The simplest device for showing that is an ordinary bathroom scale. There's no pretense that this is an accurate measuring device; it's intended to establish merely that some considerable force is being generated.

The photographs show that what I saw was not illusion.

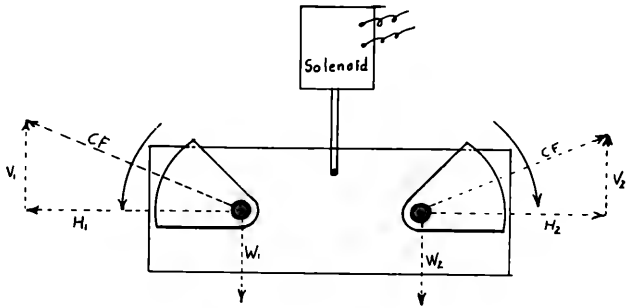
The principle of operation is, of course, what's in dispute. Science holds the device to be a "not-member of a non-existent class"—a non-existent class of "devices that don't conform to the Law of Conservation of Momentum."

I do not understand Mr. Dean's theory very clearly; my personal impression is that he doesn't understand the thing in a theoretical sense, himself. But then—the Roman engineers never did understand the physical chemistry underlying the setting of mortar. (And for that matter, modern physical chemistry doesn't either!) Dean doesn't have to understand it; he can make it work. As a businessman, he has every reason to sell an immensely useful, workable device, whether it's understandable or not—whether it's rational, or not. That chemical engineering student may be right; perhaps it is "beyond reason." A thing doesn't have to be reasonable to be useful.

I believe, however, that a very broad, general explanation of the direction to look for an explanation is possible.

Essentially, the device consists of two counter-rotating masses, on shafts rotating in a light frame, as shown on page 94. Now such a gimmick has been used to generate a powerful oscillating force in one plane; the horizontal vectors of centrifugal force generated by the two eccentric masses will always be equal and opposite, so that there is no net horizontal force. But the vertical force vectors add; with this mechanism alone, Dean would get a powerful up-and-down oscillation, the upward force being equal to the downward force at a later instant. Useful for

How to make two masses and a solenoid add up to a three-body problem.



Vectors $H_1 + H_2 = O$

Vector $V_1 + W_1 = O$ and $V_2 + W_2 = O$

driving shaker-tables for vibration tables, but nor for getting anywhere.

Now the great trouble with efforts to make centrifugal force yield a net resultant is that it insists on adding up, through a full 360°, to exactly zero. If you try accelerating the weights at some particular part of their rotation, thus changing the centrifugal force, the force used in accelerating and decelerating them then proves to balance out, very neatly if sadly, the added centrifugal force.

Oh, the centrifugal force is great enough! Centrifugal force can, without any trouble at all, tear a high-tensile steel wheel into shreds. In the super-centrifuges, they develop accelerations of 2,000,000 gee and more.

The trouble is to make it not add up to zero. What we need is something like a rectifier for alternating electric current; ordinary AC adds up to exactly zero, too, through a full 360°—but with a rectifier, you can get DC output.

Dean's device is quite simple; you simply can *not* push those weights around to make the centrifugal force come out unbalanced, without using a force equal to and opposite from the added centrifugal force.

But . . what happens if, instead of moving the masses, you *move the center of rotation?*

The center of rotation has no mass; it's a geometrical concept, not a material entity. Pushing it around doesn't require force.

In the rotation of those counter-rotating masses, there is a particular phase-angle such that the horizontal vectors are cancelled, and the vertical vector is upward, and exactly equal to the weight of the two masses. At that instant, the light framework can be moved upward *without exerting any force on the masses.*

In the demonstration model, a small solenoid, activated by a commutator, moves the frame carrying the two masses, at the required instant. It does *not* have to exert any force whatever on the masses; it does not move them. It moves their centers of rotation.

And what the effect of that is, *no modern mathematical analysis is competent to determine.* Reason: Dean's converted the problem into a "three-body problem," and that's one that mathematical techniques have never been able to handle.

The two masses, in Dean's machine, are forced to rotate about *two different centers of rotation simultaneously.*

When Newton did his work, he had, buried under it all, an unstated, and unanalyzed assumption; that there was, of course, one, and only one possible frame of reference.

The whole of Newtonian and Classical physics rested on that assumption; it worked fine until toward the end of the nineteenth century; in the beginning of the twentieth century it was really in trouble.

Einstein correctly spotted, and challenged the assumption, and showed how to handle many unresolvable problems, in terms of multi-

ple frames-of-reference. But . . . with one underlying catch. Einstein had no mathematical tools competent to analyze more than one relationship at a time; therefore he was forced to simplify the problem of reality by saying "there is no simultaneity."

The three-body problem can't be solved, because we have no techniques competent to handle the simultaneous interactions of A, B, and C. That's why astronomers, trying to compute planetary orbits, have to do it by successive approximations. First figure the orbit of Venus as though only Venus and Sol existed. Then compute the effects of Earth-Moon on that orbit. Then correct the assumed Earth-Moon orbit for the effects of Venus on it, and then recorrect the orbit of Venus for the perturbed orbit of Earth. Then compute the effect of Mercury, and—

Our mathematics can handle any two bodies at a time —any one double-ended relationship.

But it can *not* handle simultaneous multiple relationships.

So Einstein said, "There aren't any." It was a simplifying assumption which made the problems manipulable, and was justified by the great advantage gained thereby.

But Einstein never did like statistical mechanics; the nuclear physicists did, however. In nucleonics, and in solid-state physics, you can't consider one-thing-at-a-time; you are forced to consider multiple-simultaneous relationships, the general n-body problem. It can be done if the numbers are large enough, by handling it statistically.

Two counter-rotating brass weights aren't numerous enough for statistical analysis, however.

Actually, our whole present system of physics is, without Dean's help, rapidly approaching a situation where it must acknowledge gross defects. It has, to date, sort of sidled around them, without looking directly at them—but the situation remains.

It is impossible to express the horsepower output of any reaction engine, either rocket or jet, but let's stick to the pure rocket.

The trouble is, horsepower is defined as work per time-unit. Work, however, is defined as force-through-distance: $W=FS$. Now consider a rocket delivering a thrust of one thousand units, on a trip from Earth to Mars. Its velocity is one mile per second relative to Earth, and ten miles per second relative to Mars. What horsepower is the rocket engine delivering?

Well, of course—if you consider two different frames of reference, you're bound to get different answers! Einstein showed that

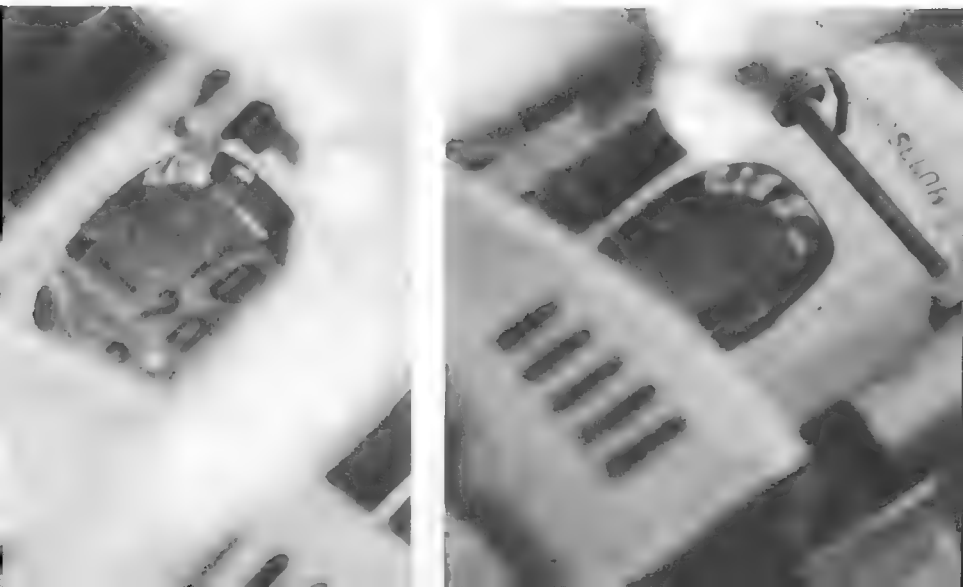
Yes, but Einstein said you weren't allowed to consider both simultaneously; the real-universe fact is that the rocket *does* have a relationship to both Earth and Mars at all times. Just because you don't know enough to be able to comprehend the interaction doesn't make that interaction cease to exist!

Let's go from the matter of horsepower—which is, after all, a nice, simple, linear function—to the matter of kinetic energy. Since kinetic energy is a quadratic function—$KE = \frac{1}{2}MV^2$—that Earth-Mars rocket has another peculiarity. For a given change in velocity, the kinetic energy changes by two very different amounts. If kinetic energy is energy, and energy is conserved . . . *which* kinetic energy do we have to be conservative about?

Note that while the greater added kinetic energy appears with respect to the Mars frame of reference, *no momentum or energy* is being transferred between the ship and Mars at the time. The ship is reacting against its exhaust gases, not Mars. But, if that ship is going to land on Mars, that kinetic energy change must be accounted for at that time.

Which kinetic energy value is conservative—the ship-Earth value, or the ship-Mars value?

Photographs of the weighing scale. These shots were taken with a 105mm F2.5 Nikor telephoto lens, reaching down through the entire demonstrator; the out-of-focus mass at the lower left is the handle of the drill. The exposures were on Panatomic X film, 1/30th second at F2.5. On the left the solenoid mechanism is off; on the right the solenoid mechanism is turned on. The shutter speed involved is of importance, as is the use of the 105mm lens; at so slow a shutter speed, if the scale were merely vibrating to a different weight-reading, the fine two-pound interval lines would not be sharp and distinct; it's difficult to hold a 35mm camera with a telephoto lens sufficiently steady for 1/30th second, but forcing the conditions in this way assured that any vibration of the scale would most certainly register clearly.



Einstein's entire theoretical structure breaks down if simultaneity is imposed as a requirement, just as Newton's broke down under the requirement of more than one frame of reference.

What happens to centrifugal force, when, in one cycle, a pair of brass weights is forced to rotate about two non-identical centers of rotation? What amount of force is required to displace a geometrical concept?

When Mr. Dean submitted his proposals, a physicist of National Aeronautics and Space Administration reported that his mathematics was unsound.

You know, personally I'm inclined to agree with that physicist on one thing; I, too, think Dean's mathematics is unsound. The point of disagreement is that I'm darned sure the physicist's mathematics is incompetent; all modern mathematics is! I have lots of positive evidence that no one can solve a three-body problem a bit better than Mr. Dean can. What Dean has done is to present the physicists with a device that imposes a three-body problem. Their mathematics is just as incompetent to handle it as Dean's—but Dean isn't trying to solve it mathematically. He's applying it engineeringly, which is somewhat different. His machine solves the problem perfectly—and the answer is rectified centrifugal force.

Understandably, the emotional impact of the concept that such a device actually exists is one that leads to powerful rejection on the part of any human being with a heavy emotional investment in "known laws of physics." It always appears, when one first encounters such a thing, that *all* the old values have been crushed —destroyed—swept away.

They haven't, of course—except for those who have pinned their entire value system to pure theory. Electronic engineers, computing transit time in ordinary vacuum tubes, don't use Einsteinian concepts; Newtonian work fine, just as they always did, within their proper range.

We've known for a century or more that our mathematics wasn't able to solve the three-body problem; it's perfectly obvious that sooner or later we're going to have to develop a technique of analysis that can handle such problems. And equally clear, from all the history of science, that that new technique will, applied to old problems, yield totally new and far more general understandings.

It just happens that, apparently, an amateur experimenter has come up with a device that belongs in the set of devices that would be normal consequences of a multiple-simultaneous-relationship mathematics, before we achieved such an analytical technique.

The theoretical physicists couldn't solve the problems of neutron behavior in a thermal-energy-level moderated nuclear reactor mathematically. That is, obviously, a multiple-simultaneous-relationship problem. To

handle the problem, they used what amounts to a rule-of-thumb engineering-style technique; they called it the "Monte Carlo System." A roulette wheel proved to be a fine analog computer for the problem.

I *think* Dean's device is a true space drive; that it does work.

But I *know* no modern physicist is competent to make a theoretical analysis of any system involving multiple-simultaneous interactions—and that there are, in the universe, precisely such systems. The number of binary stars is very, very large; there are, also, many trinary star-systems. Can such systems have stable planetary systems?

Since no serious effort has been made to crack the problem, we do not, actually, know whether the energy-interchange relationships in the Solar System are progressive, cyclic, or what. We simply cannot compute the positions of the Solar planets either 10,000,000 years ago, or 10,000,000 years hence, by that laborious system of successive approximations.

And even so—they do those calculations on the assumption that momentum and energy must be conserved. But . . . which kinetic energy of that Earth-Mars rocket is to be conserved?

The essence of the situation is—whether modern orthodox physics likes it or not—that our Laws of Conservation of Energy and Momentum are, in fact, very special cases of much more general realities. Newton we already know was fundamentally in error; it is essential, in cosmological physics, to consider more than one frame of reference. Einstein demonstrated that.

But since our laws of conservation stem from Newtonian concepts—they are suspect anyway, and were before Dean's device came along.

It is already a known fact that our mathematics is incapable of handling the three-body problem—or, in general, the problem of n simultaneous relationships, where n is greater than one. We can't, actually, handle true simultaneous equations; we can "solve" simultaneous equations only for those points at which they are not simultaneous, but identical—i.e., the points of intersection.

While I was in Washington taking a careful look at Dean's gadget, I went around to the Senate Space Committee, and to the Office of Naval Research. Both agencies had a file on Mr. Dean and his efforts to get some attention paid to his device.

Again I emphasize; *it is not important whether Dean is right or wrong; what is important is that the agencies did not find out.*

The Space Committee's file apparently shows that the idea was referred to a National Aeronautics and Space Administration scientist. His report was that Dean's mathematics was unsound; in other words, Dean's proposal was rejected on the grounds of pure theoretical consideration. That's the same grounds on which the Church Fathers rejected Galileo's proposals, and refused to look through his telescope.

At the Office of Naval Research, it was first suggested that I see the National Inventor's Council. This is a government agency set up for the primary purpose of serving as an alley into which to divert screwballs, crackpots, and assorted nuisances. It's very effective; psychologically speaking, it has the stopping power of warm tar. It's too soft to break, and too viscous to move. Remember the famous La Brea tar pits stopped mammoths, saber-toothed tigers, and practically everything else that lived at that time. You can find them still embalmed there to this day.

Instead, I went to the ONR department dedicated to evaluation of proposed inventions.

I ran an editorial here recently about an ONR research report, pointing out that the fundamental attitude of the ONR was that theoretical understanding is absolutely necessary *before* any invention can be made. On direct contact with the ONR inventions evaluations department I found that philosophy dominates their evaluations. If the device or principle cannot be explained in full, clear, acceptable theoretical terms, why, under that philosophy, it doesn't exist as an invention.

A dog can't explain the theoretical enzyme chemistry of digestion; therefore, clearly, a dog can't digest anything.

From the ONR representative to whom I spoke, I gathered that Mr. Dean, when he had been told—by letter—in a kindly but firm manner that his device was mathematically impossible, and that his explanations were unsound, had reacted somewhat irritatedly. This, of course, immediately prejudiced the ONR scientists against him. Clearly, if you tell a man he is wrong, and explain carefully the theoretical facts that prove his device doesn't exist, and he gets annoyed—he having the working model sitting beside him at the time—this proves that he really is wrong.

There is a widely believed legend —how it ever got started I'm sure I don't know—that only crackpots and fanatics get angry when they're told they are wrong.

It might be helpful if all science students were required to study, as part of their college indoctrination, the papers of Galileo and the Church Fathers who were kindly, but firmly correcting him. Also some of the choicer bits of Newton's and Hooke's remarks concerning the mental competence of their opposers.

As I say, no one from either NASA, or ONR, or the Senate Space Committee bothered to look at the device. It was explained to me that they were all *much* too busy.

Perhaps it is, actually, fortunate; a true space drive, as a national monopoly, might have precipitated the nuclear war. But if Dean is right, the ONR, NASA and the Senate Space Committee just co-operated in giving away the key to the Solar System . . . if not to the stars. (Einstein's work accepted the laws of conservation; if they are not valid, then perhaps the

speed-of-light limitation isn't either.)

The important point right now is this: No government agency knows anything at all about whether Dean's device works. They *think* they do, on the basis of theory—but there is plenty of reason to suspect that theory is as airtight as a slice of Swiss cheese. That it fits Reality the way plane geometry fits the Earth's surface—only in local areas.

Washington is a fascinating state of mind; it operates purely on the pain-avoidance principle. Animals operate on two fundamental drives—pain-avoidance and pleasure-seeking. Each tempers the other; it's a sort of "two-party" system. Thus a lion will attack a water buffalo, seeking the pleasure of a full meal, despite the fact that the buffalo is an enormously powerful and dangerous animal. The pain-avoidance drive is, in that situation, overcome, or at least greatly modified, by the pleasure-seeking drive, so that the lion will take the risk.

In Washington, there is only the pain-avoidance drive. A bureaucrat who does exactly what his directives specifically require, and absolutely nothing else—neither more nor less—avoids the pain of being fired. You can't fire him for failure to accomplish what *might have been* done; you can fire him only for not doing what his orders require.

Since nobody, in any government agency, had specific instructions "Investigate and evaluate the Dean drive," no one can be fired for not doing what he was not specifically told to do. That means not-investigating it fulfills, one hundred per cent, the requirement of pain-avoidance.

It's very rarely indeed that someone in Government can stick his neck out, and achieve something over and above his assignment. The last notable instance was Admiral Rickover's remarkable achievement of forcing the Navy into nuclear propulsion. As is now well known, he very nearly had his career crushed by the high-brass opposition; Congress saved his bacon, not a "grateful" Navy.

The best-known previous instance, of course, is that of Billy Mitchell—who was court-martialed for proving he was right, against the orders of his superior officers. That time, Congress didn't act.

Our government has the interesting characteristic of holding—with great determination—that monopoly is an evil, and, through the Federal Trade Commission, enforcing competitive situations. But, of course, this doesn't apply to *them;* government bureaus mustn't be subjected to competition!

Of course, Congress and the Senate do have competition; the two-party system is the only method that seems to work. Animal life, in the course of the last four billion years, has tried a lot of systems—but the two-party technique, known as bisexual reproduction, has overwhelmingly won the race. Male and female constitute the mutual "loyal opposition"; they are absolutely forced to

co-operate, if they want to continue their genetic existence, and yet are so constituted that they cannot possibly fall into identical viewpoints. A man can't think like a woman, nor a woman like a man, no matter how desperately each wants to; they have to work out a binocular viewpoint that integrates two inherently different understandings.

That is the only known, practical technique for assuring that orthodoxy won't set in and crystallize.

It doesn't matter, for this point, whether Dean is right or wrong. It's quite obvious that anyone who did present a true break-through concept in terms of a working space drive would be rejected in precisely the manner Dean has been, for precisely the reasons Dean has.

They are precisely the reasons Galileo was rejected.

An Orthodoxy isn't something religious; it's something associated with a True Faith, whether that faith refer to a religious concept, or a True Belief in certain Laws of Nature.

Now Mr. Dean is an excellent and successful business man; he has achieved considerable success financially in his own right. He's got the money it takes to build expensive, carefully machined test-models—and anyone who thinks that's a small-time hobby expense has never hired a machine shop to do work for him. Models are expensive; just from looking at the photographs of Dean's ex-models—the ones that had to be tested to destruction to obtain engineering data, since no modern mathematical technique can handle the problem—I'd make a wild guesstimate that they must have cost him in the neighborhood of $100,000.

No, they're not big. But a self-lifting job requires six rotor-pairs, with the associated driving gearing, commutators, et cetera. Try building a little six-cylinder gasoline engine by hand, and see what it costs—say just duplicate the little Ford Falcon engine in a commercial machine shop. The complete Falcon costs about two thousand dollars; think you could hand-tool the engine alone for even twice that?

Dean—or anyone with a break-through idea—will be stopped by the Orthodoxy effect. But someone like Dean, who is also a darned sight more successful business man than top-notch physicists—remember that Einstein had to have help in working out his income tax?—has economic resources by which he could force a way through to test his ideas. (I've heard, since, from four other men who had ideas closely paralleling Dean's, but didn't have the money to build and test models.) As Dean said, "If they continue to refuse to pay attention, I can, and will, build a full-scale vehicle, and hover over Washington until they do."

(Side comment on that: he'll probably be forced down, and arrested for violating a restricted air-space, while his vehicle is impounded where no one can get at it. If he goes up to an altitude where they can't reach him, they won't mind; who'll see it one hundred miles up?)

Now what Dean has, is *not* antigravity; it's a drive.

Anyone here want to make any large-size bets that the secret of antigravity hasn't already been cracked by some backwoods unorthodox amateur—who isn't, as Dean is, a highly competent business man as well? How many individuals can afford $100,000 worth of private test-model building?

There are other fields of science where things are under even "better" monopoly control; the physical scientists do not very frequently run into a brilliant amateur with more money than they have. But the medical society has things sewed up even tighter; the brilliant amateur with money can be stopped legally from demonstrating his achievement.

Russia has out-achieved the United States so far in the development of new techniques. Furiously as the intellectual-scientists despise the system whereby politicians can legislate for or against scientific beliefs—the Lysenko controversy, for example—the wry fact is that it has produced some results. It took action by Congress to get Admiral Rickover off the hook; the problem of whether or not nuclear propulsion should be used in the Navy was a technical-scientific problem—and it was resolved in favor of the United States *only by legislative action.*

The probability that ONR or NASA will, at this late date, willingly accept the Dean device for actual test and study, is vanishingly small. If they do so, it will constitute an admission that it merits testing—and, of course, it is then acknowledged that it should have been tested in the summer of 1956. (NASA is off that hook, of course; they didn't exist in 1956. But they have been around for some time, now—and existed before the patent was publicly issued.)

Again, it's going to take a legislative act, not a scientific act, to get the device tested. The scientific groups are forced to maintain "Testing it is not, and never was, within the limits of our directive; you can't say *we're* responsible for trying it."

Because Russia's scientific system is new—effectively only about twenty years old—it hasn't had time to establish a solid orthodoxy. Therefore it gets nudged—but good and solidly! —every so often, and gets things done, however unhappily.

We don't. Our satellite program, for instance, the Vanguard Project, not only turned out to be a "Me Too" project—it never did succeed in doing what the Navy said they were going to do. Not one full-scale Vanguard satellite was put up in orbit during the International Geophysical Year; they never did accomplish what they had loudly and publicly stated they would do.

We got satellites up only after public and legislative—not scientific! —howls of anger at Russia's success.

But this time I think the Orthodox Science system has flopped so egregiously—pulled so screaming a boner —that something may be done.

By sheer Orthodoxy refusal to con-

sider the possibility that their theory *might* be inadequate—they never found out about the Dean drive.

Our cover shows what could have been done—and still could be done, for that matter.

A modern nuclear-powered submarine needs only relatively minor adaptations to make an ideal spaceship; it has everything needed, save for the space drive.

The Dean drive requires a rotary shaft drive; our nuclear submarines turn nuclear energy into heat, produce steam, drive a turbine, and generate electric power. Electric power is perfect for running the Dean drive.

The modern submarines are—we have learned from past sad experiences—equipped with lifting eyes so that, in event of accidental collision, quick salvage is possible. Pontoons can be towed in place, sunk beside the ship, and hitched to the built-in lifting eyes, and the ship refloated. The eyes are, of course, designed into the ship so that the structure can be lifted by those eyes without structural damage to the hull.

Dean drive units could be attached directly to the existent eyes.

The pressure hull of modern submarines is designed to resist at least six hundred feet of water pressure; its actual thickness is a piece of classified data, of course, but we can guesstimate it must be at least four inches thick. After the second Bikini bomb test, the old submarine *Skate* was still in pretty fair condition; the light-metal streamlining hull looked like the remains of an airliner crash . . . but the pressure hull was perfectly intact. Stout stuff, a sub's pressure hull.

And very fine stuff indeed as protection against the average meteor; the light streamlining hull would stop the micrometeors, of course.

Not even four *feet* of steel would stop primary cosmic rays, of course . . . but those inches of armor steel would have considerable damping effect on the Van Allen radiation belt effects.

The nuclear submarines have already been tested with full crews for thirty continuous days out of contact with Earth's atmosphere; their air-cycling equipment is already in place, and functions perfectly. What difference if the "out of contact" situation involves submersion in water, instead of in space?

The modern nuclear submarine is, in fact, a fully competent space-vehicle . . . lacking only the Dean drive.

With the Dean drive, the ship, if it can lift off Earth at all, can generate a one-gee vertical acceleration. Since that acceleration is being generated by engines capable of continuous operations for months—if not years—at a time, the acceleration can simply be maintained for the entire run; there would be no period of free-fall for the ship or crew. Therefore the present ship structure, equipment, and auxiliary designs would be entirely satisfactory. (Plumbing facilities satisfactory for use in free-flight haven't been designed as yet!) Also, a sub has various plumbing devices with

built-in locks so the equipment can be used under conditions where the external pressure is widely different from the internal.

In flight, the ship would simply lift out of the sea, rise vertically, maintaining a constant 1,000 cms/sec/sec drive. Halfway to Mars, it would loop its course, and decelerate the rest of the way at the same rate. To the passengers, and to the equipment aboard, there would be no free-flight problems.

There is one factor that has to be taken into account, however; the exhaust steam from the turbine has to be recondensed and returned to the boiler. In the sea, sea water is used to cool the condenser; in space no cooling water is available.

In the cover picture, the huge semi-silvered sphere is the condenser; it's a plastic-film balloon silvered on one—the sunward—side, and blackened on the other. There being no air-resistance in space, the condenser balloon can be three hundred feet, three thousand feet, or whatever is needed to yield the required radiation surface. If it were made of elastic material, it would be automatically self-adjusting; if the steam pressure rose, the balloon would expand, increasing the radiation area, until the temperature —and hence pressure—dropped. (And it wouldn't freeze and grow brittle; it's a steam-condenser, remember.)

The tough part would be the first hundred miles up from Earth; there, air resistance would prevent use of the balloon condenser. However, since spare water has to be carried anyway, the ship could take off with the spare water in the form of ice; it takes considerable heat-energy to melt, say, one hundred tons of ice. Before it was melted, the ship would be at an altitude that would, if necessary, allow direct discharge of the steam into the thin upper atmosphere, until the balloon could be inflated.

As a crash program, this could have been done—if work started when Dean first applied for his patent—in fifteen months. The application went in in July, 1956; fifteen months later would have been October, 1957.

Under the acceleration conditions described above, a ship can make the trip from Earth to Mars, when Mars is closest, in less than three days. And even when Mars is at its farthest possible point, on the far side of the Sun, the trip takes only *five days.*

It would have been nice if, in response to Sputnik I, the United States had been able to release full photographic evidence of Mars Base I.

I do not insist that I am incontrovertibly right, but it is my opinion—based on observational data that the United States Government has avoided acquiring—that we actually had everything necessary to do just that. We certainly had the nuclear subs to use—and I believe the Dean Drive can do it.

Even more important, now that we've given away the Solar System, is the fact that the fundamental principle underlying Dean's device *is* fundamental. It's not just the key to a

space drive; the principle of simultaneous multiple relationships is enormously broader than that.

The psychologists have complained that there was no mathematical technique for their work. Quite so; they too, obviously need a math capable of expressing multiple simultaneous relationships.

No electronic device can recognize a pattern; that's why no machine can be made to recognize words spoken by widely varying voices. (The ten-year-old Southern girl and the drunken longshoreman with a bad cold may both be saying "I want to go home!", as any human fool can plainly understand. But no machine can.) A pattern exists where there is multiple simultaneous relationship.

It is the inherent nature of any Orthodoxy to freeze at the level it has achieved, developing only the ramifications and details of that level. The dinosaurs developed a million variations on the theme dinosaurism . . . but none of those variations was mammalianism.

The question really is: How can orthodoxy in Science be ended? Of course, we can have acts of legislative bodies impose new ideas by fiat —the system we've been using recently, and that the Soviets use. It isn't good; it's just better than none.

Life forms solved it quite some megayears ago; they use the two-party system. We've found that works in political systems, and in religious systems. (Religion hasn't been harmed by having Catholic and Protestant Christian churches, though it took some bloodshed and violence to put over the idea.)

Perhaps we could make a lot better and faster progress if Science and Engineering were recognized and established as distinct, and—by legislative fiat at first—made two separate and distinct parties. Who can better criticize a Scientist's theory, than an Engineer who tries to make the thing work? And who can better criticize an Engineer's efficiency than a Scientist, who analyzes with exact precision what it is the Engineer is really doing—and not what he *thinks* he's doing?

The scientists, in Edison's day, had mathematical proof that the maximum possible efficiency of an electric generator was fifty per cent. They still had the mathematics after Edison started manufacturing ninety-eight per cent efficient generators.

You know, there's nothing like a good Republican to spot a Democratic grafter—or a good Democrat to expose the incompetence of a Republican. And everybody benefits except the incompetent and dishonest individuals.

Look, don't we believe in the fundamental validity of two-party competition? Then what's wrong with a two-party Science, to permanently terminate the freeze effect of orthodoxy?

THE END

(*Continued from page* 82)
other haven. If they knew me that well, I'd never be safe where I had stashed my suitcase.

There was a 'copter squatting at the Sky Hi's ramp. I jumped for it and had him drop me toward the outskirts of the town of Lake Tahoe, and then walked a few blocks, mostly in circles to see if I were being followed, before darting into a fairly seedy motel a couple blocks off the main drag.

My room was on the third floor of the flea-bag. Part of the place was only two stories high. The door at the end of my corridor opened out onto the roof. When I had calmed down, I stepped through the door into the cool of the desert night.

The gravel on the built-up roof crunched in the darkness under my feet as I walked cautiously to the parapet and looked over its edge to the hunk of desert that stretched away toward Reno, out behind the motel. The third story, behind me, cut off the neon glare from the Strip and left the place in inky darkness. There was silence and invisibility out behind the motel.

Feeling a little creaky about falling a couple stories to the ground, I lay down on my back on the narrow parapet, with my hands behind my head to soften the concrete a little, and looked straight up into the night sky. A dawdling August Perseid scratched a thin mark of light across the blackness. I heard a coyote howl. This was desert. This was peace. The dice and chuck-a-luck seemed ten thousand miles away.

I heard a sound. Gravel crunched dimly under another foot. Somebody had stepped invisibly onto the roof. It scared the daylights out of me, more so because I was flat on my back. Cautiously I turned my head toward the door I had come through. I could see the fuzzy redness of a cigarette in the dark. It brightened as the smoker took a drag. Then I heard the sniffle, and knew who it was.

She stood there, apparently leaning against the wall behind her, silently, invisible but for the glow of her cigarette, and not moving her feet. "Hello," I said at last.

"Wasn't sure you wanted to talk," she said out of the dark. It shook me up. She certainly couldn't *see* me.

"How'd you know I was here?" I asked her.

"I don't know how. But I knew you would be." That wasn't what I had asked, exactly. She sniffled, and I could almost see the back of her hand swipe at the bead of moisture that kept forming at the tip of her skinny nose. Made me think. Psi powers crop up more often than they should in folks who are marked with a debility. It's the old compensation story. Look at my weak right arm. What she had said about *expecting* to find me on the roof sounded like precognition. And she sniffled and sniffled. Maybe it was one more of those tied-in hysterical Psi weaknesses.

"What are you doing out here?" I asked her.

"Resting," she said wearily. "I just hit town today."

"And tired already?"

"I was broke," she said. "Worked in a hotel laundry till dinner time to get eatin' money. Hot work. But I swiped a nice dress to wear when I went looking for you, Billy Joe."

"Yeah," I said, hiding my snicker over the dress. "Say, I wanted to thank you for handling my chips. I'd have lost my shirt if I hadn't let you show me how. I wanted to slip you a cut, but you bugged out of there."

"I figured you should handle our money, Billy Joe," she said. "Anyway, can't take money for my gift."

She had me shaking with excitement. "You have a gift?" I said, trying to keep my voice calm.

"Just some nights. Since I broke my vow, I've lost most of my prophecy. My real gift is healing. Lost *all* of that," she concluded, not bitterly. "God is punishing me."

Gravel crunched as she came slowly across the roof toward me. The fag end of her cigarette made a spinning arc in the night as she snapped it over the side of the roof. Now there was no way to see her at all. Perception is nice in the dark. I tracked her automatically.

"What was the vow you broke?" I said.

She sighed, near me. "I divorced my husband, my own darlin' Billy," she said. "There's no divorce in Heaven."

"Tough," I said. I thought *I* was her darlin' Billy. Talk about Doublethink! "Will you miss never having a man again? I mean, once you've been a wife—" I added, letting it drift off.

"God has been good to me," she said out of the dark. "He let me see my own future, that he would give me a husband again."

That was a curve. "Isn't that an even worse breaking of vows?" I said. "I mean, if in God's sight you're still married to Billy Joe?"

"Would be," she conceded from the black, now right next to me. "But He told me that the man I should seek *would be* Billy Joe—hit's a miracle worked for me." Her voice lowered. "A miracle that come to pass tonight, my darlin' Billy." A shiver ran its fingers up my spine. She meant every word of it. I *was* her darlin' Billy.

I wasn't in any mood to get married, and least of all to a seeress. Precognition is the least understood of the Psi powers, and the most erratic. But of all people, I could least afford to sneer at the power of Psi.

For the first time, I guess, I realized the awful helplessness that comes over the Psiless when a TK invokes his telekinetic power. I wanted no part of the future this corn-fed oracle had conjured up. But it might be the only future I'd ever have.

I tried to recall her looks. Thinking about them, they really added up to no more than hysterical snif-

flies, not enough to eat, and the pathetic evidence that there hadn't been any money for orthodonture. Fatten her up, straighten her teeth and— Talk about *religious* rationalization!

I snapped out of it. Maybe she could call the turn of dice. But I'd be damned if she could call the turn of people. Let her try *me*.

I sat up on the parapet, swinging to put my feet on the gravel of the roof. "So tonight you found the husband God's been going to give you?" I asked.

"Yes," she said softly.

"And I'm the one?"

"Yes!"

"Not that again!" I growled, grabbing her thin shoulders and shaking her. Her glasses bobbled on her nose. "I'm *not* your darlin' Billy, and you well know it. Admit it!"

She closed her lips over her buck teeth and sniffled. "I reckon not," she said, raising her head and looking at me without flinching. "I lied to you."

"Why?"

"Kind of made me feel more decent about bein' divorced."

I gave her a last shake for the lie. "Let's have it," I went after her. "How much of what you've been feeding me is just window dressing?"

She shrugged, but stayed silent.

"*Have* you been married?" I insisted.

"Yes, Billy Joe."

"*And* divorced?"

"Oh, darlin' Billy," she sighed. "I

jest shouldn't never a *done* that. But I did," she added.

"Talk English," I snapped. "This chitterlin's and corn pone are just more window dressing, right?"

Her face was solemn behind the glasses. "When you are a smart girl, and you know the future, too, they hate you and try to hurt you," she said. "They don't seem to mind it so much if it comes from a piece of white trash that never could be 'no account.' By the time I was twelve or so I had learned to act just a little stupid and corn-fed."

This, her longest speech, she delivered in quiet, Neutral American, the speech that covers the great prairie states and is as near accentless and pure as American English ever is. It branded her Ozark twang as a lie, and a great many other things about her. But it added something very solid to her claims of prophecy.

"All this," I said. "Because you see the future?"

"Yes, Billy Joe."

"And this talk about losing your prophecy because of divorce was just that, talk?" I insisted.

Her mouth worked silently. "I talk like trash, and sometimes I start to think like it," she confessed. "I even act like it. I've tried not to see things acomin'. But," she added, drifting back into her Ozark lingo. "Always I knowed I was to find you. I knowed I was to go and search in spots of sin, for there you would be. And it kept getting stronger on me where to seek. This night I knew it was the time. I never got a dress and all before."

The chilly fingers touched me again. Still, what she was saying made some weird kind of sense. "What about the healing?" I tried, feeling a trap slowly descending over me.

She smiled at that. "I guess I put that punishment on myself for what I done," she said.

"Then you can still heal the sick?" I asked. She shrugged. "I want you to try," I added.

"Not till I get a sign," she said, moving uneasily. "I'm to get a sign."

I waved my hands in disgust and turned away from her. "There had to be some fakery in it somewhere," I said. "You couldn't heal a hangnail!"

"Not a fake!" she said hotly. "I *have* healed the sick!"

"Don't get uppity," I said. "So have I. You see," I told her. "I'm a doctor. Not much of a one," I admitted, pointing to my weak right arm. "I can't heal myself."

"Oh, yore pore arm," she said.

"Show me," I said, turning on her. "Heal me!"

"I'm to have a sign!" she wailed.

Well, she got one. I took her to my room, pointed at the dresser. One of the glasses on the tray beside a pitcher rose, floated into the bath and, after we had both heard the water run, came back through the air and tilted to trickle a few drops of water onto her head.

Her words gave her away—she was no mystic. She swung her eyes

back to me: "TK!" she gasped. She recoiled from me. She'd had a viper to her bosom.

"Heal me!" I snapped at her. "You've had your sign, and I'm your darlin' Billy."

"I got to find it," she said desperately. "The weak place."

I flopped on the bed, stretched my arm out against the counterpane. She ran her fingers over it—the old "laying on of hands." If she were the real thing, I knew what it was—perception at a level a TK can't match. The real healers feel the nerves themselves. I'd been worked on before. The more hysterical healers, some really creepy witches, had given me some signs of relief, but none could ever find the real "weak place," as she called it.

She was mumbling to herself. I guess you could call it an incantation. I got a picture of a nubile waif, too freakish to fit where she'd been raised. What had her Hegira been like? In what frightful places had she found herself welcome? From her talk, it could have been an Ozark backwater. I didn't want to know what backwoods crone had taught her some mnemonic rendition of the Devil's Litany.

Her hands passed up beyond my shoulder, to my neck. "It's in yore haid," she said. "In yore darlin' haid!" Fingers worked over my scalp. "Oh, there!" she gasped. "Hit's ahurtin' me! Hurtin', hurtin', and I'm a draggin' it off'n yuh!" Her backwoods twang sharpened as she aped some contemporary witch.

Hurt? She didn't know what it meant. She fired a charge of thermite in my head, and it seared its way down my arm to my fingers. My right arm came off the bed and thrashed like a wounded snake. She wrestled it, climbed onto the bed, and held it down with her boney knees. Her fingers kneaded it, working some imaginary devil out through the fingertips, till the hurt was gone.

We sat close together on the edge of the bed at last, as I worked and moved my arm, one of us more in awe of what had happened than the other. It was weak—with those flabby, unused muscles, it had to be. But I could move it, to any normal position.

"I never done like that before," she breathed. "Jest small ailin'."

"You're a healer, all right," I said. "And a prophetess, too, from what I saw at the dice table. You know what a Psi personality is?" I asked her. "Say, what is your name, anyway?"

"Pheola," she said. "Yes, I've heard of them," she said.

"You're one," I told her. "You can heal many people."

She shook her head. "Only could do it because I love you, Billy Joe," she said.

"We'll teach you," I promised her. "Would you like to learn? You've heard of the Lodge, haven't you?"

"Lordy!" she gasped.

"You're as good as in it," I told

her. "Now tell me, what am I going to do tomorrow morning?"

She got up and started to pace the room, sniffling. "Why would you do that?" she said at length. "You are going to the bank, first thing. You've got all that money. It's thousand dollar bills! And you're writing on them." She frowned at me, sniffling again. "Do I *really* see it?" she asked. "Is that right?"

"I'll make it right," I said. "Come on," I told her. "If we're going to stay up all night, we need fuel. How long since you've tackled a twenty-ounce sirloin?"

The Lodge has unmentioned influence. No, Psi powers aren't a secret government. But what high official can afford to be at odds with us? They know where the Lodge stands. A little while on the visor as the east pinked up got me what I wanted. Because of the three-hour time difference, the Washington brass got me *carte blanche* before banking hours at the Tahoe bank that supplied the Sky Hi Club with its cash.

Working with the cashier, who hadn't even taken time to shave after getting his orders from the Federal Reserve Bank, I went over their stock of thousand dollar bills, as Pheola had PC'd I would, and marked down the edges of the stacks with grease pencil. Mostly I did it to make my grip firmer. When the time came, I could make that money jump.

Pheola let me get her a cocktail dress in one of the women's shops. The right dress helped, but more steaks would have helped even more. I'll bet I put five pounds on her that day. She was one hungry 'cropper. Hungry and sniffly.

We idled away the afternoon and waited until nearly midnight to go back to the Sky Hi Club. Action is about at its peak then, and if the cross-roader had been tipping dice again, as they suspected, they would have had time to notice which table wasn't making its vigorish.

Plain enough where they were having trouble. Fowler Smythe was scowling through his glasses behind a table with Barney, the dealer I'd hit with the Blackout. Their faces were sweating in the dry desert air. The table was being taken.

"Now watch it, Pheola," I said, as we squeezed into the crowd, opposite the dealers. "Almost anything can happen. I want to know the instant you get a feeling. You understand?" She nodded and wiped at her drippy nose with a clean handkerchief. I'd gotten her a dozen.

There was the same old racket. The burnt out voice of a chanteuse, coming over the PA system from the dining room, tried to remember the sultry insouciance with which it had sung "Eadie was a Lady" in its youth. Waiters in dude-ranch getups swivel-hipped from table to table like wraithes through the mob of gamblers, trays of free drinks in their hands. This time Pheola didn't have the same greedy grab for the *hors d'oeuvres*. She'd wrapped herself

around a couple pounds of high-quality protein before we had come to the casino.

The gamblers were urging the dice with the same old calls, and the stick-men were chanting: "Coming out!" "Five's the point!" "And *seven!* The dice pass!" and all the rest. The ivories had a way to go before they reached us. I gave Pheola a stack of ten-buck chips and let her bet, without making any effort to tip the dice. She still had it. She moved the chips back and forth from "Pass" to "Don't Pass" and won at every roll. I could see Fowler Smythe begin to scowl as she let her winnings ride, building up a real stack.

Without warning she dragged down her winnings and leaned close to me, sniffling. "You'll get all wet!"

I looked around, seeing a waiter near me. He had just served drinks to the rear half of the table, to the gamblers nearest the dealers. His tray was still half-full. This was the moment. It was a generalized sort of lift, the kind of thing that qualifies a TK for the Thirty-third degree. I heaved at the thousand-dollar bills I had had marked in the morning, without the faintest idea of where they were. The tray lurched in the waiter's hand, throwing glasses to the floor. Most of them shattered when they struck the real wood planks, splashing whisky and mix on our legs.

I looked across the table and grinned at Fowler Smythe. His scowl had an awful lot of forehead to work on. "What the devil!" I could read his lips say over the racket. But Barney, the stick-man who'd felt my Blackout, caught on a lot quicker.

I was about to freeze him with a clamp on his thyroid. It's just as effective as wrapping your fingers around the throat. But Pheola upset the apple cart.

She grabbed my right arm, so newly powerful. "No, Billy Joe!" she cried. "I *don't* want to die!"

"Who's dying?" I snapped.

"He's shooting me!" she gasped.

Shoot? With what? I had one terrified moment—what to lift? What was aimed at her? At the last possible moment I saw it. His crap-stick was a hollow tube, and he was raising it toward *me,* not toward Pheola. I'd heard of things like that —a gas-powered dart gun. Silent, and shooting a tiny needle with a nerve poison in grooves cut in its tip.

I lifted, but half in panic. Fowler Smythe squeezed his trigger and the tiny dart leaped unseen across the crap layout. My lift had been way off—it should have thrown the stick toward the ceiling, where no one would have been hurt. Instead it merely twitched the crap-stick, and the dart struck Pheola in the left hand. She screeched a little and grabbed at the needle-prick with her fingernails.

You never know how much power there is in Psi until you use it without restraint. I threw the crowd back away from us with a lift that nearly blacked me out, and had Pheola on the wet boards of the floor before

she could blink. She had only seconds to live unless I blocked all circulation to and from her arm. I found the spots in her armpit and lifted the veins and arteries into a complete block.

A whiff of garlic told me that Simonetti had reached the table. He'd been watching on the TV monitor, of course. He knelt down beside us.

"A doctor, quick," I said. "She's been pinked with nerve poison."

"She's gone, then," he said huskily. "Who done it?"

"Fowler Smythe," I said bitterly. "A snake within the Lodge. You might try to stop him. But your partner, Rose, is the real crook. Get the doc, then tie up Rose."

"She's gone," he insisted. "Nerve poison kills right now."

"He's right, Billy Joe," Pheola said softly. "I'm going numb all over."

"What did I tell you?" Simonetti husked at me. I had enough left to hit him sharply over the temples with a lift. "A doctor. With antidote," I snapped. He trotted away.

"Darlin' Billy!" she said, and her heart stopped. She was dead. I picked her up in my arms and carried her to the same sawdust-strewn private dining room where I'd given Barney the Blackout.

I had to split the lift. The tourniquet was an absolute necessity, or more of the nerve poison would enter her system. But her heart *couldn't* stop. The brain can only stand a few seconds of that. I hadn't let it miss three beats. Even as I carried her from the casino, I lifted the main coronary muscle and started a ragged pumping, maybe forty beats a minute. Once in the smaller room I began artificial respiration with my mouth.

The sawbones was there in three minutes. I guided the tip of his hypodermic into a vein in her right arm, the one that still had blood coursing through it. He depressed the piston, pumping the antidote into her bloodstream. Little by little I let up on the clamp on her wounded left arm, dribbling the poisoned blood into her system, so that the antidote could react with it gradually. She stayed unconscious.

Then I felt it. Her heart muscle tugged back at my lift. It was struggling to beat on its own. I matched my lifts to its ragged impulses, feeling it steady to a normal seventy-two as the antidote took effect.

Her eyes opened at last, and we stopped respiration. "Billy Joe!" she smiled. She was back from the dead.

In an hour we had returned to the motel. She was as good as new, but badly shaken.

"I still don't know what happened," she said.

I shrugged. "Smoke screen, Pheola. Every time there's a run of luck on a crap table, somebody yells 'TK!' And I suppose there's a number of TK's who aren't in the Lodge, and who figure to make a killing here and a killing there by tipping the dice. But any decent TK, even a Fowler Smythe, can spot them.

"There was TK in this, but not tipping dice. Smythe is a skunk. He's no Twenty-fifth, or he wouldn't have any need to go crooked. He saw a chance to make a killing. He suggested it to Rose, who fell for it and went along. Rose decided to steal Simonetti's half of the business from his partner with Smythe's help. It was no more complicated than smuggling thousand dollar bills off the table in false bottoms of trays that drinks were being served on. Smythe was using TK to lift the bills into those false bottoms, well screened by the trays from the TV monitors. Barney was in on it, of course. And after the joint had lost enough dough that way, Rose and Simonetti would have had to sell out. Only the buyer would have been a dummy for Rose and Smythe, using money Smythe had lifted off the tables.

"The whole TK business was just a smoke screen to keep matters confused," I concluded.

"How come they dared send for a TK like you? Why weren't they scared you'd catch them, just like you did?"

"It took a little more than TK," I reminded her. "TK is just a power, one more ability in life. It doesn't make you God. Once in a while it gives you a little more vigorish than the other guy has, that's all. And sometimes it's not enough."

"But you had enough vigorish to catch them," she pointed out.

"In a way," I said. "I told them TK wasn't enough—that it would take precognition. And I don't have PC. I had to bring a PC with me. You, Pheola. That's why I'm alive. Smythe would have killed me with that dart gun of his. *You* were my vigorish!"

We rode the 'copter together to the airport. Old Grand Master Maragon would sneer out of the other side of his face when I brought Pheola to him. He couldn't keep *her* from PC training. She *had* it.

"Tell me," I asked her. "Can you always tell what I'm going to do next?"

"I reckon," she said. "If I think hard about it."

"But you can't *control* what I'm going to do next, can you?" I grinned.

"I wonder," she said. "Never tried, yet."

"Oh, no!" I groaned.

She showed me her buck teeth in a smile. "I figger first you'll have them straighten my teeth," she said. "You'd like a pretty wife."

"If it's got to be," I said weakly. "That would help. I just wish there was some way to handle that hysterical sniffle of yours, that's all. But I guess that's the price you have to pay for that awful load of Psi power you have."

"Oh, that," she said. "I ought to be over that by tomorrow. I hardly ever get a cold, darlin' Billy, and when I do, I throw it off in a few days."

Well, I guess it's a cinch I'm no PC.

THE END

OUT...

LIKE A LIGHT

By MARK PHILLIPS

Conclusion. Catching a juvenile delinquent who can teleport is tough enough... but if you did catch him, how could you possibly hold him?

Illustrated by Freas

SYNOPSIS

When stolen red 1972 Cadillacs start running around all over New York, Connecticut, and New Jersey —often, apparently, without any drivers—the time has come for ANDREW J. BURRIS, *Director of the FBI, to assign the case to Agent* KENNETH J. MALONE *and his co-worker, Agent* THOMAS BOYD, *a huge man whose fringe beard gives him a remarkable resemblance to Henry VIII.*

They go to New York to investigate the weird occurrences.

One evening, Malone spots an unoccupied red Cadillac parked near the curb on a deserted street and steps over to take a look at it. He wakes up several minutes later. The car is missing, and Malone has nothing to show for his adventure but a bruised blackjack cut on his head and a notebook that was evidently dropped by his mysterious assailant. The notebook contains odd pictures, queer symbols, cryptic notations, and a list of names. Also in the book is his own name and the name of LIEUTENANT PETER LYNCH, *of the New York Police.*

Malone goes to see Lynch, who identifies the list of names as RAMON OTRAVEZ, MARIO GRITO, SILVO ENVOZ, FELIPE ALTAPOR, ALVAREZ la BARBA, JUAN de los SANTOS, *and* RAY del ESTE, *a group of teen-agers who call themselves the* SILENT SPOOKS. *Missing from the list is the name of* MIGUEL FUEYO, *the leader of the gang. Malone deduces rightly that the book must belong to Mike Fueyo and goes to his home to interview him.*

Lieutenant Lynch, however, who is also anxious to solve the mystery of the self-steering red Cadillacs, has already arrested Mike. Malone goes back to the precinct station and insists on talking to the boy alone.

As soon as he is alone with the boy, a startling thing happens.

Mike Fueyo gives Malone a large, juicy raspberry and then simply vanishes. He has gone from the interrogation room without a trace. There is no way out except through the door, and the hall is guarded by Lynch and two policemen.

Since he has no explanation for Mike's disappearance, he obviously can't explain it to Lynch, so he simply says its "classified information" and ducks out.

He recalls that DR. THOMAS O'CONNOR, *a psionics expert working for Westinghouse, had mentioned that teleportation is theoretically possible and decides that teleportation is the only possible explanation.*

Meanwhile, Tom Boyd has made arrangements to have every red Cadillac in the area inspected by DR. LIEBOWITZ, *of the electronic engineering firm of* LIEBOWITZ & HARDIN, *since it is Burris' theory that the cars are controlled by tiny electro-psionic brains concealed in them somewhere.*

At FBI headquarters, Malone gets a call from Mike Fueyo's mother.

She informs him that Mike has run away from home. Puzzling over this new fact, he leaves FBI headquarters on Sixty-ninth Street and strolls downtown to keep a date with a girl named DOROTHY FRANCIS, *whom he met at the precinct station where Lynch has his office. On the way down, he stops in a bar, and phones Police Commissioner* JOHN HENRY FERNACK *and aks him to check on all crimes committed in the past few months in which stores and homes have been robbed without leaving traces of how they were broken into. Then he goes to another bar and phones Lynch, asking him to check up on the Silent Spooks. He makes a small bet that every one of them has left home.*

Malone manages to have a couple of drinks at both bars, and then he goes on to Topp's, a restaurant on Forty-second Street, where he is to meet Dorothy. Together, they make a night of it, and Malone manages to take on a little more bourbon than he should have.

He wakes up the next morning with a Grade A hangover and without the Fueyo notebook.

Police Commissioner Fernack calls to tell him that the crimes he had asked about the evening before had been occurring exactly according to Malone's prediction. There has been an upsurge of robberies in which there was no trace of how the culprits had entered.

Malone calls Lynch and finds that his second prediction is also correct. All of the Silent Spooks have vanished from their homes and their usual haunts. He also says that a social worker named ALBERT KETTLEMAN *would like to talk to Malone. Malone makes the appointment to talk to Kettleman.*

He stops to check with FBI headquarters to find that Liebowitz & Hardin have found no trace of any electro-psionic devices on any of the red Cadillacs so far. Then he goes to meet Kettleman.

Kettleman, it turns out, does have one bit of vital information which he'd received through the juvenile grapevine. The Silent Spooks hang out in an empty warehouse on the downtown west side of the city. Naturally, they manage to get in and out without opening the doors.

Then Malone goes out in search of the missing notebook. He follows the route that he and Dorothy took the night before—theater, bars, and cafes, and finally ends up at Topp's. No one anywhere has seen his notebook.

Either he dropped it somewhere or—and he doesn't like to think of it—Dorothy stole it from him. But why would she do that?

The bartender informs him that there is a long-distance call for Sir Kenneth Malone. It could be no one else than a pleasantly psychotic little old lady, ROSE THOMPSON, *who is firmly convinced that she is* QUEEN ELIZABETH I, *of England, and that Sir Kenneth is a Knight in the Queen's Own FBI. She is allowed to continue her harmless delusion, and is even pampered*

by the Government because she is the only operating telepath they have yet discovered.

She informs him pleasantly that he is quite right in his deductions. She has, of course, been tapping his mind telepathically, and, through him, the mind of Dorothy Francis.

Malone tries frantically to think of some reason for the girl's stealing the notebook, and he doesn't like the deduction he arrives at.

But Her Majesty says sadly: "That's right. She's Dorothea Francisca Fueyo—little Miguel Fueyo's older sister."

PART 3

XII.

ALONE put in a great deal of time, he imagined, just staring at the face of the little old lady in the screen. At last he said: "Her name is Fueyo!"

"I've told you so," the Queen said with some asperity.

"I know," Malone said. "But—"

"You're excited," the Queen said. "You're stunned. Goodness, you don't need to tell me that, Sir Kenneth. I know."

"But she's—" Malone discovered that he couldn't talk. He swallowed a couple of times and then went on. "She's Mike Fueyo's sister."

"That's exactly right, Sir Kenneth," the Queen said.

"Then she . . . swiped the book to protect her little brother," Malone said. "Oh, boy."

"Exactly, Sir Kenneth," the Queen said.

"And she doesn't care about me at all," Malone said. "I mean, she only went out with me because I was me, Malone. And she wanted the notebook. That was all there was to it."

"I wouldn't say that, if I were you," she went on. "Quite the contrary. She does like you, you know. And she thinks you're a very nice person." The Queen beamed. "You are, you know," she said.

"Oh," Malone said uncomfortably. "Sure."

"You don't have to think that she merely went out with you because of her brother's notebook," the Queen said. "But she does have a strong sense of loyalty—and he *is* her younger brother, after all."

"He sure is," Malone said. "He's a great kid, little Mike."

"You see," the Queen continued imperturbably, "Mike told her about losing the notebook the other night —when he struck you."

"When he struck me," Malone said. "Oh, yes. He struck me all right."

"He guessed that you must have it when you started asking questions about the Silent Spooks, you see," the Queen said. "That was the only way you could have found out about him —unless you were telepathic. Which, of course, you're not."

"No," Malone said.

"Now, understand me," the Queen said. "I do not think that his striking you was a very nice act."

"I don't either," Malone said. "It hurt like . . . it hurt quite a lot."

"Certainly," the Queen said. "But, then, he didn't hurt the car any, and he didn't want to. He just wanted to ride around in it for a while."

"He likes red Cadillacs," Malone said.

"Oh, yes," the Queen said. "He thinks they're wonderful."

"Good for him," Malone said sourly.

"Well, now," the Queen said. "You just go right on over to her house. Of course, she doesn't live with an aunt."

"No," Malone said. "She lives with Mike and his mother."

"Why not?" the Queen said. "She's part of the family."

Malone nodded silently.

"She'll give you the book, Sir Kenneth. I just know that she will. And I want you to be very nice to her when you ask for it. She's a very nice girl, you know."

"She's a swell girl," Malone said morosely. "And I'll . . . hey. Wait a minute."

"Yes, Sir Kenneth?"

"How come you can read her thoughts?" Malone said. "And Mike's? I thought you had to know somebody pretty well before you could read them at a distance like this. Do you? Know them, I mean."

"Oh, no," the Queen said. "But I can read *you*, of course." Malone could see that the Queen was trying very hard not to look proud of herself. "And last night," she went on, "you two were . . . well, Sir Ken-

neth, you had a real *rapport* with each other. My goodness, yes."

"Well," Malone said, "we—"

"Don't explain, Sir Kenneth," the Queen said. "It really isn't necessary; I thought it was very sweet. And—in any case—I can pick her up now. Because of that rapport. Not quite as well as I can pick you up, but enough to get the strong surface thoughts."

"Oh," Malone said. "But Mike—"

"I can't pick him up at all, this far away," the Queen said. "There is just a faint touch of him, though, through the girl. But all I know about him is what she thinks." She smiled gently. "He's a nice boy, basically," she said.

"Sure he is," Malone said. "He's got a nice blackjack, too— basically." He grimaced. "Were you reading my mind all last night?" he said.

"Well," the Queen said, "no. Toward morning you were getting so fuzzy I just didn't bother."

"I can understand that, Malone said. "I nearly didn't bother myself."

The Queen nodded. "But toward afternoon," she said, "I didn't have anything to do, so I just listened in. You do have such a nice mind, Sir Kenneth—so refreshing and different. Especially when you're in love."

Malone blushed quietly.

"Oh, I know," the Queen said. "You'd much rather think of yourself as a sort of apprentice lecher, a kind of cynical Don Juan, but—"

"I know," Malone said. "Don't tell me about it. All right?"

"Of course, Sir Kenneth," the Queen said, "if you wish it."

"Basically, I'm a nice boy," Malone said. "Sure I am." He paused. "Do you have any more pertinent information, Your Majesty?"

"Not right now," the Queen admitted. "But if I do, I'll let you know." She giggled. "You know, I had to argue awfully hard with Dr. Hatterer to get to use the telephone," she said.

"I'll bet," Malone said.

"But I did manage," she said, and winked. "I won't have that sort of trouble again."

Malone wondered briefly what dark secret Dr. Hatterer had, that Her Majesty had discovered in his mind and used to blackmail him with. At last he decided that it was probably none of his business, and didn't matter too much anyway.

"Quite right, Sir Kenneth," the Queen said. "And good-bye for now."

"Good-bye, Your Majesty," Malone said. He bowed again, and flipped off the phone. Bowing in a phone booth wasn't the easiest thing in the world to do, he thought to himself. But somehow he had managed it.

He reached into his pocket—half-convinced, for one second, that it was an Elizabethan belt-pouch. Talks with Her Majesty always had that effect; after a time, Malone came to believe in her strange, bright world. But he shook off the lingering effects of her psychosis, fished out some coins and thought for a minute.

So Dorothy—Dorothea—had lifted the notebook. That was some help,

certainly. It let him know something more about the enemy he was facing. But it wasn't really a lot of help.

What did he do now?

Her Majesty had suggested going to the Fueyo house, collaring the girl—but treating her nicely, Malone reminded himself—and demanding the book back. She'd even said he would get the book back—and, since she knew some of what went on in Dorothea Fueyo's mind, she was probably right.

But what good was that going to do him?

He knew what was in the book. Getting it back was something that could wait. It didn't sound particularly profitable and it didn't even sound like fun.

What he needed was a next move. He thought for a minute, dropped the coins into the phone and dialed the number of the police commissioner's office. After a brief argument with a secretary, he had Fernack on the phone. And this time, Malone told himself, he was going to be polite.

If possible.

"Good afternoon, John Henry," he said sunnily, when the commissioner's face was finally on the screen. "Can you get me some more information?"

Fernack stared at him sourly. "Depends," he said.

"On what?" Malone said, telling himself he wasn't going to get irritated, and knowing perfectly well that he was lying.

"On what kind of information you want," Fernack said.

"Well," Malone said, "there's a warehouse I want to know some more about. Who the owner is, for one thing, and—"

Fernack nodded. "I've got it," he said. He fished, apparently on his desk, and brought up a sheet of paper. He held it up to the screen while Malone copied off the name and address. "Lieutenant Lynch told me all about it."

"Lynch?" Malone said. "But he—"

"Lynch works for me, Malone," Fernack said. "Remember that."

"But he said he'd—"

"He said he wouldn't do anything, and he won't," Fernack said. "He just reported it to me for my action. He knew I was working with you, Malone. And I *am* his boss, remember."

"Great," Malone said. "Now, John Henry—"

"Hold it, Malone," Fernack said. "I'd like a little information, too, you know. I'd like to know just what is going on, if it isn't too much trouble."

"It's not that, John Henry," Malone said earnestly. "Really. It's just that I—"

"All this about vanishing boys," Fernack said. "Disappearing into thin air. All this nonsense."

"It isn't nonsense," Malone said.

"All right," Fernack said indulgently. "Boys disappear every day like that. Sure they do." He leaned toward the screen and his voice was

as hard as his face. "Malone, are these kids mixed up with those impossible robberies you had me looking up?"

"Well," Malone said, "I think so. But I doubt if you could prove it."

Fernack's face had begun its slow climb toward purple again. "Malone," he said, "if you're suppressing evidence, even if you are the FBI, I'll—"

"I'm not suppressing any evidence," Malone said. "I don't think *you* could prove a connection. I don't think *I* could prove a connection. I don't think *anybody* could—not right now."

Fernack leaned back, apparently mollified.

"John Henry," Malone said, "I want to ask you to keep your hands off this case. To let me handle it my way."

Fernack nodded absently. "Sure, Malone," he said.

"What?"

"I said sure," Fernack said. "Isn't that what you wanted?"

"Well, yes," Malone said, "but—"

Fernack leaned all the way back in his chair, his face a mask of disappointment and frustration. "Malone," he said, "I wish I'd never heard of this case. I wish I'd been retired or died before it ever came up. I've been a police officer in New York for a long time, and I wish this case had waited a few more years to happen."

He stopped. Malone leaned against the back wall of the phone booth and lit a cigarette.

"Andy Burris called me less than half an hour ago," Fernack said.

"Oh," Malone said.

"That's right," Fernack said. "Good old Burris of the FBI. And he told me this was a National Security case. National Security. It's your baby, Malone, because Burris wants it that way." He snorted. "So don't worry about me," he said. "I'm just here to co-operate. The patriotic, loyal, dumb slave of a grateful government."

Malone blew out a plume of smoke. "You know, John Henry," he said, "you might have made a good FBI man yourself. You've got the right attitude."

"Never mind the jokes," Fernack said bitterly.

"O.K.," Malone said. "But tell me: Did you actually make arrangements for me to get into that warehouse? I suppose you know that's what I want."

"I guessed that much," Fernack said. "I haven't made any arrangements at all yet, but I will. I'll have Safe and Loft get the keys, and a full set of floor plans to the place while they're at it. Will that do, Your Majesty?"

Malone choked on his smoke and shot a quick look over his shoulder. There was nothing there but the wall of the booth. Queen Elizabeth I was nowhere in evidence. Then he realized that Fernack had been talking to him.

"Don't do that," he said.

"What?" Fernack said.

Malone realized in one awful sec-

ond how strange the explanation was going to sound. Could he say that he thought he'd been mistaken for an old friend of his, Elizabeth Tudor? Could he say that he'd just had a call from her?

In the end he merely said: "Nothing," and let it go at that.

"Well, anyhow," Fernack said, "do you want anything else?"

"Not right now," Malone said. "I'll let you know, though. And—thanks, John Henry. No matter why you're doing this, thanks."

"I don't deserve 'em," Fernack muttered. "And I hope you get caught in some kind of deadfall and have to come screaming to the cops."

That, Malone reflected, was the second time a cop had suggested his yelling if he got into trouble.

Hadn't the police force ever heard of telephones?

He said good-by and flipped off.

Then he stared at the screen for a little while, as his cigarette burned down between his fingers. At last he put the cigarette out and went downstairs again to the bar.

If he had to do some heavy thinking, he told himself, there was absolutely no reason why he couldn't enjoy himself a little while doing it.

The evening rush had begun, and Malone found himself a stool by the simple expedient of slipping into one while a drinker's back was turned. Once ensconced, he huddled himself up like an old drunk, thus effectively cutting himself off from interruptions, and lit another cigarette. Ray was down at the other end of the bar, chatting with a red-headed woman and her pale, bald escort. Malone sighed and set himself to the job of serious, constructive thinking.

How, he asked himself, do you go about catching a person who can vanish away like so much smoke?

Well, Malone could think of one solution, but it was pretty bloody. Nailing the kids to a wall would probably work, but he couldn't say much else for it. There had to be another way out. For some reason Malone just couldn't see himself with a mouthful of nails, a hammer and a teen-ager.

It sounded just a little too messy.

Then, of course, there were handcuffs.

That sounded a little better. The trouble was that Malone simply didn't have enough information, and knew it. Obviously, the kids could carry stuff with them when they teleported; the stuff they stole proved that. And their clothes, Malone added. Apparently the kids didn't arrive at wherever they went stark staring naked.

But how close to a teleport did the things he carried have to be?

In other words, Malone thought, if you put handcuffs on a teleport, would the handcuffs vanish when the teleport did? And did that include the part of the cuff you were holding?

What happened if you snapped half the cuff around your own wrist first? Did you go along with the teleport? Or did your wrist go, while

you stayed behind and wondered how long it would take to bleed to death?

Or what?

All the questions were intriguing ones. Malone sighed, wishing he knew the answer to even one of them.

It was somewhat comforting to think that he'd managed to progress a little, anyway. The kids hadn't meant anybody to find out about them—but Malone had found out about them, and alerted all the cops in town, as well as the rest of the FBI. He knew just who they were, and where they lived, and how they performed the "miracles" they performed.

Anyhow, he knew something about that last item.

He even knew who had his notebook.

He tabled that thought, and went back to feeling victorious. Within a few seconds, the sense of achievement was gone, and futility had come in its place. After all, he still didn't know how to catch the kids, did he?

No.

He thought about handcuffs some more and then gave up. He'd just have to try it and see how it worked. And if the teleports took his wrist away he'd . . . he'd . . . he'd go after them and make them give it back.

Sure he would.

That reminded him of the notebook again, and, since the thing was being so persistent, he decided he might as well pay some attention to it.

Dorothea had the notebook. Malone tried to see himself barging in on her and asking for it, and he didn't care for the picture at all—no matter how Good Queen Bess felt about it.

After all, she thought Mike Fueyo was basically a nice kid.

So what did she know?

He closed his eyes. There he was, in the Fueyo apartment, talking to Dorothea.

"Dorothea," he muttered. "You filched my notebook."

That didn't sound very effective. And besides, it wasn't really his notebook. He tried again.

"Dorothea, you pinched your brother's notebook."

Now, for some reason, it sounded like something covered by the Vice Squad. It sounded terrible. But there were other ways of saying the same thing.

"Dorothea," he muttered, "you borrowed your brother's notebook."

That was too patronizing. Malone told himself that he sounded like a character straight out of the 3-D screens, and settled himself gamely for another try.

"Dorothea, you *have* your brother's notebook."

To which the obvious answer was: "Yes, I do, and so what?"

Or, possibly: "How do you know?"

And Malone thought about answering that one. "Queen Elizabeth told me," was the literal truth, but somehow it didn't sound like it. And

he couldn't find another answer to give the girl.

"Dorothea," he said, and a voice from nowhere added:

"Will you have another drink?"

Malone exploded, "That's not the question. Drinks have nothing to do with notebooks. I'm after notebooks. Can't you understand—" Belatedly, he looked up.

There was Ray, the barman.

"Oh," he said.

"I just came over," Ray said. "And I figured if you couldn't find your notebook, maybe you'd like a drink. So long as you're here."

"Ray," Malone said with feeling, "you are an eminently reasonable fellow. I accept your solution. Nay, more. I endorse your solution. Wholeheartedly."

Ray went off to mix, and Malone stared after him happily. This was really a nice place, he reflected—almost as nice as the City Hall Bar in Chicago where he'd gone long ago with his father.

But he tore his mind away from the happy past and concentrated, instead, on the miserable present. He decided for the last time that he was not going to ask Dorothea for the book—not just yet, anyhow. After all, it wasn't as if he needed the book; he knew his own name, and he knew Lynch's name, and he knew the names on the second page. And he didn't see any particular need for a picture of a red Cadillac, no matter how nicely colored it was.

So, he asked himself, why embarrass everybody by trying to get it back?

Of course, it *was* technically a crime to pick pockets, and that went double or triple for the pockets of FBI agents. But Malone told himself that he didn't feel like pressing charges, anyhow. And Dorothy probably didn't make a habit of pocket-picking.

He sighed and glanced at his watch. It was fifteen minutes of six.

Now, he knew what his next move was going to be.

He was going to go back to his hotel and change his clothes.

That is, he amended, as soon as he finished the drink that Ray was setting up in front of him.

XIII.

By the time Malone reached the Statler Hilton Hotel it was six-twenty. Malone hadn't reckoned with New York's rush-hour traffic, and, after seeing it, he still didn't believe it. Finding a cab had been impossible, and he had started for the subway, hoping that he wouldn't get lost and end up somewhere in Brooklyn.

But one look at the shrieking mob trying to sardine itself into the Seventh Avenue subway entrance had convinced him it was better to walk. Bucking the street crowds was bad enough. Bucking the subway crowds was something Malone didn't even want to think about.

He let himself into his room, and was taking off his shoes with a grate-

ful sigh when there was a rap on the door of the bathroom that connected his room with Boyd's. Malone padded over to the door, his shoes in one hand. "Tom?" he said.

"You were expecting maybe Titus Moody?" Boyd called.

"O.K.," Malone said. "Come on in."

Boyd pushed open the door. He was stripped to the waist, a state of dress which showed the largest expanse of chest Malone had ever seen, and he was carrying the small scissors which he used to trim his Henry VIII beard. He stabbed the scissors toward Malone, who shuffled back hurriedly.

"Listen," Boyd said, "did you call the office after you left this afternoon?"

"No," Malone admitted. "Why? What happened?"

"There was a call for you," Boyd said. "Long Distance, just before I left at five. I came on back to the hotel and waited until I heard you come in. Thought you might want to know about it."

"I do, I guess," Malone said. "Who from?" Looking at Boyd, a

modern-day Henry VIII, the association was too obvious to be missed. Malone thought of Good Queen Bess, and wondered why she was calling him again.

And—more surprising—why she'd called him at FBI headquarters, when she must have known that he wasn't there.

"Dr. O'Connor," Boyd said.

"Oh," Malone said, somewhat relieved. "At Yucca Flats."

Boyd nodded. "Right," he said. "You're to call Operator Nine."

"Thanks." Malone went over to the phone, remembered his shoes and put them down carefully on the floor. "Anything else of importance?" he asked.

"On the Cadillacs," Boyd said. "We've got a final report now. Leibowitz and Hardin finally finished checking the last of them—there weren't quite as many as we were afraid there were going to be. Red isn't a very popular color around here."

"Good," Malone said.

"And there isn't a doggone thing on any of 'em," Boyd said. "Oh, we cleared up a lot of small-time crime, one thing and another, but that's about all. No such thing as an electro-psionic brain to be found anywhere in the lot. Leibowitz says he's willing to swear to it."

Malone sighed. "I didn't think he'd find one," he said.

"You didn't?"

"No," Malone said.

Boyd stabbed at him with the scissors again. "Then why did you cause all that trouble?" he said.

"Because I thought we might find electro-psionic brains," Malone said wearily. "Or one, anyhow."

"But you just said—"

Malone picked up the phone, got Long Distance and motioned Boyd to silence in one sweeping series of moves. The Long Distance Operator said: "Yes, sir?" May we help you?"

"Give me Operator Nine," Malone said.

There was a buzz, a click and a new voice which said: "Operator Ni-yun. May we help you?"

"All nine of you?" Malone muttered. "Never mind. This is Kenneth Malone. I've got a call from Dr. Thomas O'Connor at Yucca Flats. Please connect me."

There was another buzz, a click and an ungodly howl which was followed by the voice of Operator Ni-yun saying: "We are connecting you. There will be a slight delay. We are sor-ree."

Malone waited. At last there was another small howl, and the screen lit up. Dr. O'Connor's face, as stern and ascetic as ever, stared through at Malone.

"I understand you called me," Malone said.

"Ah, yes," Dr. O'Connor said. "It's very good to see you again, Mr. Malone." He gave Malone a smile good for exchange at your corner grocery: worth, one icicle.

"It's good to see you, too," Malone lied.

"Mr. Burris explained to me what it was that you wanted to talk to me about," O'Connor said. "Am I to understand that you have actually found a teleport?"

"Unless my theories are away off," Malone said, "I've done a lot better than that. I've found eight of them."

"Eight!" Dr. O'Connor's smile grew perceptibly warmed. It now stood at about thirty-four degrees Fahrenheit. "That is really excellent, Mr. Malone. You have done a fine job."

"Thanks," Malone muttered. He wished that O'Connor didn't make him feel quite so much like a first-year law student talking to an egomaniacal professor.

"When can you deliver them?" O'Connor said.

"Well," Malone said carefully, "that depends." O'Connor seemed to view the teleports as pieces of equipment, he thought. "I can't deliver them until I catch them," he said. "And that's why I wanted to talk to you."

"Some slight delay," Dr. O'Connor said, "will be quite understandable." His face left no doubt that he didn't like the necessity of understanding anything that was going to keep him and the eight teleports apart for even thirty seconds longer, now that he knew about them.

"You see," Malone said, "they're kids. Juvenile delinquents, or something like that. But they are teleports, that's for sure."

"I see," Dr. O'Connor said.

"So we've got to nab them," Malone said. "And for that I need all the information I can get."

Dr. O'Connor nodded slowly. "I'll be happy," he said, "to give you any information I can provide."

Malone took a deep breath, and plunged. "How does this teleportation bit work, anyhow?" he said.

"You've asked a very delicate question," Dr. O'Connor said. "Actually, we can't be quite positive." His expression showed just how little he wanted to make this admission. "However," he went on, brightening, "there is some evidence which seems to show that it is basically the same process as psychokinesis. And we do have quite a bit of empirical data on psychokinesis." He scribbled something on a sheet of paper and said: "For instance, there's this." He held the paper up to the screen so that Malone could read it.

It said:

$$\frac{m\,d}{f\,t^2} = K$$

Malone looked at it for some seconds. At last he said: "It's very pretty. What is it?"

"This," Dr. O'Connor said, in the tone of voice that meant You Should Have Known All Along, But You're Just Hopeless, "is the basic formula for the phenomenon, where m is the mass in grams, d is the distance in centimeters, f is the force in dynes and t is the time in seconds. K is a

constant whose value is not yet known."

Malone said: "Hm-m-m," and stared at the equation again. Somehow, the explanation was not very helpful. The value of *K* was unknown. He understood that much, all right, but it didn't seem to do him any good.

"As you can see," Dr. O'Connor went on, "the greater the force, and the longer time it is applied, the greater distance any mass can be moved. Or, contrariwise, the more mass, the greater mass, that is, the easier it is to move it any given distance. This is, as you undoubtedly understand, not at all in contradistinction to physical phenomena."

"Ah," Malone said, feeling that something was expected of him, but not being quite sure what.

Dr. O'Connor frowned. "I must admit," he said, "that the uncertainty as to the constant *k*, and the lack of any real knowledge as to just what kind of force is being applied, have held up our work so far." Then his face smoothed out. "Of course, when we have the teleports to work with, we may derive a full set of laws which—"

"Never mind that now," Malone said.

"But our work is most important, Mr. Malone," Dr. O'Connor said with a motion of his eyebrows. "As I'm sure you must understand."

"Oh," Malone said, feeling as if he'd been caught without his homework, "of course. But if you don't mind—"

"Yes, Mr. Malone?" Dr. O'Connor said smoothly.

"What I want to know," Malone said, "is this: what are the limitations of this . . . uh . . . phenomenon?"

Dr. O'Connor brightened visibly. "The limitations are several," he said. "In the first place, there is the force represented by *f* in the equation. This seems to be entirely dependent on the . . . ah . . . strength of the subject's personality. That is, if we assume that the process is at all parallel with the phenomena of psychokinesis and levitation. And there are excellent theoretical reasons for so believing."

"In other words," Malone said, "a man with a strong will would be able to exert more force than a weaker-willed man?"

"Correct," Dr. O'Connor said. "And another factor is the time, *t*. What we are measuring here is the span of attention of the individual—the ability of the subject's mind to concentrate on a given thing for a span of time. Many people, for example, cannot keep their attention focused on a single thought for more than a few milliseconds, it seems. They are . . . ah . . . 'scatter-brained,' as the saying is."

His expression left no doubt that he included Malone in that group. Malone tried not to look nervous.

Then Dr. O'Connor scowled. "There is another factor which we feel should be in the equation," he said, "but we have not yet found a precise way to express it mathematically. You must realize that the

mathematical treatment of psionics is, as yet, in a relatively primitive stage."

"Oh," Malone said. "Of course. Sure. But this other factor—"

"It is what might be called the . . . ah . . . *volume* of attention," Dr. O'Connor said. "That is, the actual amount of space that can be conceived of and held by the subject, during the time he is concentrating."

Malone blinked.

"For most people," Dr. O'Connor said, "the awareness of the space surrounding them is limited to a few inches of moving space, no more. To put this in a purely physical matrix: one might say that the 'teleportation field' doesn't extend more than a few inches beyond the skin of the subject. Thus, it would be difficult to teleport anything really large unless one were able to increase the volume of attention, or awareness. However, it is difficult to express this notion mathematically."

"I'll bet," Malone said.

Dr. O'Connor shot him a frozen glance. "One of our early attempts," he said, "was simply to put this in as a volume factor, so that the left-hand side of the equation, below the line, would read—" He scribbled again on the paper and held it up:

$$\frac{m\,d}{d^3ft^2} = \bar{K}$$

"Unfortunately, as you can perhaps see," Dr. O'Connor said, "the equation would not stand up under dimensional analysis."

"Oh, sure," Malone said, adding sympathetically: "That's too bad. But does that put a limit on how much a man could carry with him? I mean, he couldn't take a whole building along, or anything like that, could he?"

"I doubt it," Dr. O'Connor said gravely. "That would require a tremendous volume of space for one to focus his entire attention on, as a whole, for any useful length of time. It would require a type of mind that I am not even sure exists."

"In the case of a young, inexperienced boy," Malone said stubbornly, "would you say that he could carry off anything heavy?"

"Of course not," Dr. O'Connor said. "Nor, as a matter of fact, could he carry off anything that was securely bolted down; I hope you follow me?"

"I think so," Malone said. "But look here: suppose you handcuffed him to, say, a radiator or a jail cell bar."

"Yes?"

"Could he get away?"

Dr. O'Connor appeared to consider this with some care. "Well," he said at last, "he certainly couldn't take the radiator with him, or the cell bar. If that's what you mean." He hesitated, looked slightly shamefaced, and then went on: "But you must realize that we lack any really extensive data on this phenomenon."

"Of course," Malone said.

"That's why I'm so very anxious

to get those subjects," Dr. O'Connor said.

"Dr. O'Connor," Malone said earnestly, "that's just what I had in mind from the start. I've been going to a lot of extra trouble to make sure that those kids don't get killed or end up in reform schools or something, just so you could work with them."

"I appreciate that, Mr. Malone," O'Connor said gravely.

Malone felt as if someone had given him a gold star. Fighting down the emotion, he went on: "I know right now that I can catch one or two of them. But I don't know for sure that I can hold one for more than a fraction of a second."

"I see your problem," Dr. O'Connor said. "Believe me, Mr. Malone. I do see your problem."

"And is there a way out?" Malone said. "I mean a way I can hold on to them for—"

"At present," Dr. O'Connor said heavily, "I have no suggestions. I lack data."

"Oh, fine," Malone said. "We need the kids to get the data, and we need the data to get the kids." He sighed. "Hooray for our side," he added.

"There does appear to be something of a dilemma here," Dr. O'Connor admitted sadly.

"Dilemma is putting it mildly," Malone said.

Dr. O'Connor opened his mouth, shut it, opened it again and said: "I agree."

"Well," Malone said, "maybe one of us will think of something. If anything does occur to you, let me know at once."

"I certainly will," Dr. O'Connor said. "Believe me, Mr. Malone, I want you to capture those—kids—just as badly as you want to capture them yourself."

"I'll try," Malone said at random. He flipped off and turned with a sense of relief back to Boyd. But it looked as if Henry VIII had been hit on the head with a cow, or something equally weighty. Boyd looked glassy-eyed and slightly stunned.

"What's the matter with you?" Malone said. "Sick?"

"I'm not sick," Boyd said carefully. "At least I don't think I'm sick. It's hard to tell."

"What's wrong?"

"Teleporting?" Boyd said. "Juvenile delinquents?"

Malone felt a sudden twinge in the area of his conscience. He realized that he had told Boyd nothing at all about what had been going on since the discovery of the notebook two nights ago. He filled his partner in rapidly while Boyd stood in front of the mirror and rather shakily attempted to trim his beard.

"That's why I had the car search continue," Malone said. "I was fairly sure the fault wasn't in the cars, but the boys. But I had to make absolutely sure."

Boyd said: "Oh," chopped a small section out of the center of his beard and added: "My hand's shaky."

"Well," Malone said, "that's the story."

"It sure is quite a story," Boyd said. "And I don't want you to think I don't believe it. Because I don't."

"It's true," Malone said.

"That doesn't affect me," Boyd said. "I'll go along with the gag. But enough is enough. Vanishing teenagers. Ridiculous."

"Just so you go along with me," Malone said.

"Oh, I'll go along," Boyd said. "This is my vacation, too, isn't it? What's the next move, Mastermind?"

"We're going down to that warehouse," Malone said decisively. "I've got a hunch the kids have been hiding there ever since they left their homes yesterday."

"Malone," Boyd said.

"What?"

"You mean we're going down to the warehouse *tonight?*" Boyd said.

Malone nodded.

"I might have known," Boyd said. "I might have known."

"Tom," Malone said. "What's wrong?"

"Oh, nothing," Boyd said. "Nothing at all. Everything's fine and dandy. I think I'm going to commit suicide, but don't let that bother you."

"What happened?" Malone said.

Boyd stared at him. "You happened," he said. "You and the teenagers and the warehouse happened. Three days' work—ruined."

Malone scratched his head, found out that his head still hurt and put his hand down again. "What work?" he said.

"For three days," Boyd said, "I've been taking this blond chick all over New York. Wining her. Dining her. Spending money as if I were Burris himself, instead of the common or garden variety of FBI agent. Night clubs. Theaters. Bars. The works. Malone, we were getting along famously. It was wonderful."

"And tonight—" Malone said.

"Tonight," Boyd said, "was supposed to be the night. The big night. The payoff. We've got a date for dinner—T-bone steak, two inches thick, with mushrooms. At her apartment, Malone."

"You'll have to break it," Malone said sympathetically. "Too bad, but it can't be helped now. You can pick up a sandwich before you go."

"A sandwich," Boyd said with great dignity, "is not my idea of something to eat."

"Look, Tom—" Malone began.

"All right, all right," Boyd said tiredly. "Duty is duty. I'll go call her."

"Fine," Malone said. "And meanwhile, I'll get us a little insurance."

"Insurance?"

"John Henry Fernack," Malone Malone said, "and his Safe and Loft Squad."

XIV.

The warehouse was locked up tight, all right, Malone thought. In the dim light that surrounded the neighborhood, it stood like a single

stone block, alone near the waterfront. There were other buildings nearby, but they seemed smaller; the warehouse loomed over Malone and Boyd threateningly. They stood in a shadow-blacked alley just across the street, watching the big building nervously, studying it for weak points and escape areas.

Boyd whispered softly: "Do you think they have a lookout?"

Malone's voice was equally low. "We'll have to assume they've got at least one kid posted," he said. "But they can't be watching all the time. Remember, they can't do everything."

"They don't have to," Boyd said. "They do quite enough for me. Do you realize that, right now, I could be—"

"Break it up," Malone said. He took a small handset from his pocket and pressed the stud. "Lynch?" he whispered.

A tinny voice came from the earpiece. "Here, Malone."

"Have you got them located yet?" Malone said.

"Not yet," Lynch's voice replied. "We're working on a triangulation now. Just hold on for a minute or so. I'll let you know as soon as we've got results."

The police squads—Lynch and his men, the warehouse precinct men and the Safe and Loft Squad—had set up a careful cordon around the area, and were now hard at work trying to determine two things.

First, they had to know whether there was anybody in the building at all.

Second, they had to be able to locate anyone in the building with precision.

The silence of the downtown warehouse district helped. They had several specially designed, highly sensitive directional microphones aimed at the building from carefully selected spots around the area, trying to pick up the muffled sounds of speech or motion within the warehouse. The watchmen in buildings nearby had been warned off for the time being so that their footsteps wouldn't occlude any results.

Malone waited, feeling nervous and cold. Finally Lynch's voice came through again. "We're getting something, all right," he said. "There are obviously several people in there. You were right, Malone."

"Thanks," Malone said. "How about that fix?"

"Hold it a second," Lynch said. Wind swept off the river at Malone and Boyd. Malone closed his eyes and shivered. He could smell fish and iodine and waste, the odor of the Hudson as it passes the city. Across the river lights sparkled warmly. Here there was nothing but darkness.

A long time passed, perhaps ten seconds.

Then Lynch's voice was back: "Sergeant McNulty says they're on the top floor, Malone," he said. "Can't tell how many for sure. But they're talking and moving around."

"It's a shame these things won't pick up the actual words at a distance," Malone said.

"Just a general feeling of noise is all we get," Lynch said. "But it does some good."

"Sure," Malone said. "Now listen carefully: Boyd and I are going in. Alone."

Lynch's voice whispered: "Right."

"If those mikes pick up any unusual ruckus—any sharp increase in the noise level—come running," Malone said. "Otherwise, just sit still and wait for my signal. Got that?"

"Check," Lynch said.

Malone pocketed the radiophone. "O.K., Tom," he whispered. "This is H-hour—M-minute—and S-second."

"I can spell," Boyd muttered. "Let's move in."

"Wait a minute," Malone said. He took his goggles and brought them down over his eyes, adjusting the helmet on his head. Boyd did the same. Malone flicked on the infrared flashlight he held in his hand.

"O.K.?" he whispered.

"Check," Boyd said.

Thanks to the goggles, both of them could see the normally invisible beams of the infrared flashlight. They'd equipped themselves to move in darkness without betraying themselves, and they'd be able to see where a person without equipment would be blind.

Malone stayed well within the shadows as he moved silently around to the alley behind the warehouse and then to a narrow passageway that led to the building next door. Boyd fol-

lowed a few feet behind him along the carefully planned route.

Malone unlocked the small door that led into the ground floor of the building adjoining. As he did so he heard a sound behind him and called: "Tom?"

"Hey, Malone," Boyd whispered. "It's—"

Before there was any outcry, Malone rushed back. Boyd was struggling with a figure in the dimness. Malone grabbed the figure and clamped his hand over its mouth. It bit him. He swore in a low voice, and clamped the hand over the mouth again.

It hadn't taken him more than half a second to realize what, whoever it was who struggled in his arms, it wasn't a boy.

"Shut up!" Malone hissed in her ear. "I won't hurt you."

The struggle stopped immediately. Malone gently eased his hand off the girl's mouth. She turned and looked at him.

"Kenneth Malone," she said, "you look like a man from Mars."

"Dorothea!" Malone gasped. "What are you doing here? Looking for your brother?"

"Never mind that," she said. "You play too rough. I'm going home to mother."

"Answer me!" Malone said.

"All right," Dorothea said. "You must know anyhow, since you're here. Yes, I'm looking for that fat-headed brother of mine. But now I suppose it's too late. He'll . . . he'll go to prison."

Her voice broke. Malone found his shoulder suddenly occupied by a crying face.

"No," he said quickly. "No. Please. He won't."

"Really?"

Boyd whispered: "Malone, what is this? It's no place for a date. And I—"

"Oh, shut up," Malone told him in a kindly fashion. He turned back to Dorothea. "I promise he won't," he said. "If I can just talk to your brother, make him listen to reason, I think we can get him and the others off. Believe me."

"But you—"

"Please," Malone said. "Believe me."

"Oh, Ken," Dorothea said, raising her head. "Do you . . . do you mean it?"

"Sure I mean it," Malone said. "What have I been saying? The Government needs these kids."

"The Government?"

"It's nothing to worry about," Malone said. "Just go on home now, all right? I'll call you tomorrow. Late tonight, if I can. All right?"

"No," Dorothea said. "It's not all right. Not at all."

"But—"

Boyd hissed: "Malone!"

Malone ignored him. He had a bigger fight on his hands. "I'm not going home," Dorothea announced. "I'm going in there with you. After all," she added, "I can talk more sense into Mike's head than you can."

"Now, look," Malone began.

Dorothea grinned in the darkness. "If you don't take me along," she said quietly, "I'll scream and warn them."

Malone surrendered at once. He had no doubt at all that Dorothea meant what she said. And, after all, the girl might really be some use to them. And there probably wouldn't be much danger.

Of course there wouldn't, he thought. He was going to see to that.

"All right," he said. "Come along. Stick close to us, and don't worry about the darkness. We can see, even if you can't, so let us guide you. But be quiet!"

Boyd whispered: "Malone, what's going on?"

"She's coming with us," Malone said, pointing to Dorothea.

Boyd shrugged. "Malone," he said, "who do you think you are? The Pied Piper of Hamelin?"

Malone wheeled and went ahead. Opening the door, he played his I-R flashlight on the room inside and he, Boyd and Dorothea trailed in, going through rooms piled with huge boxes. They went up an iron stairway to the second floor, and so on up to the roof.

They moved across the roof quickly under the cold stars, to the wall of the warehouse, which was two stories higher than the building they were on. Of course, there were no windows in the warehouse wall facing them, except on the top story.

But there was a single, heavy, fireproof emergency exit. It would have taken power machinery or explosives to open that door from the outside without a key, although from the inside it would open easily.

Fortunately, Malone had a key.

He took it out and stepped aside. "Give that lock the works," he whispered to Boyd.

Boyd took a lubricant gun from his pocket and fired three silent shots of special oil into the lock. Then he shot the hinges, and cracks around the door.

They waited for a minute or two while the oil, forced in under pressure, did its work. Then Malone fitted the key carefully into the lock and turned it, slowly and delicately. The door swung open in silence. Malone slipped inside, followed by Boyd and Dorothea Fueyo.

Infrared equipment went on again, and the eerie illumination spread over their surroundings. Malone tapped Boyd on the shoulder and jerked his thumb toward the back stairs. This was plainly no time for talk.

From the floor above, they could hear the murmur of youthful voices.

They started for the stairway. Fortunately, the building was of the steel-and-concrete type; there were no wooden floors to creak and groan beneath their feet.

At the bottom of the stairs, they paused. Voices came down the stairwell clearly, even words being defined in the silence.

". . . And quit harping on whose fault it was." Malone recognized Mike Fueyo's voice. "That FBI guy

was on to us, and we had to pull out; you know that. We always figured we'd have to pull out some day. So why not now?"

"Yeah," another voice said. "But you didn't have to go and vanish right under that Fed's nose. You been beating into our heads not to do that sort of stuff ever since we first found out we could make this vanishing bit. And then you go and do it in front of a Fed. Smart. Sure, you get a big bang out of it, but is it smart? I ask you—"

"Yeah?" Mike said. "Listen, Silvo, they never would've got onto us if it hadn't been for your stupid tricks. Slugging a cop on the dome. Cracking up a car. You and your bug for speed!"

Malone blinked. Then it hadn't been Miguel Fueyo who'd hit Sergeant Jukovsky, but Silvo. Malone tried to remember the list of Silent Spooks. Silvo . . . Envoz. That was it.

"You slugged the FBI guy, Mike," Silvo said. "And now you got us all on the run. That's your fault, Mike. I want to see my old lady."

"I had to slug him," Mike said. "Listen, all Ramon's stuff was in that Cadillac. What'd have happened if he'd found all that stuff?"

"So what happened anyway?" another voice—Ramon?—said. "He found your stupid notebook, didn't he? He went yelling to the cops, didn't he? We're running, ain't we? So what difference?"

"Shut up!" Mike roared.

"You ain't telling me to shut up!" (That was the third voice, Malone thought; possibly Ramon Otravez.)

"Me either!" Silvo yelled. "You think you're a great big-shot, you think you're king of the world!"

"Who figured out the Vanish?" Mike screamed. "You'd all be a bunch of bums if I hadn't showed you that! And you know it! You'd all—"

"Don't give us that!" Silvo said. "We'd have been able to do it, same as you. Like you said, anybody who's got talent could do it. There were guys you tried to teach—"

"Sure," said a fourth voice. "Listen, Fueyo, you're so bright—so why don't you try teaching it to somebody who don't have the talent?"

"Yeah!" said voice number five. "You think you could teach that flashy sister of yours the Vanish?"

"You shut up about my sister, Phil!" Mike screamed.

"So what's so great about her?"

"She got that book back from the Fed," Mike said. "That's what. It's enough!"

A voice said, "Any dame with a little—"

"Shut your face before I shut it for you!"

Malone couldn't tell who was yelling what at who after a minute. They all seemed unhappy about being on the run from the police, and they were all tired of being cooped up in a warehouse under Mike's orders. Mike was the only person they could take it out on—and Mike was under heavy attack.

Two of the boys, surprisingly, seemed to side with him. The other five were trying to outshout them. Malone wondered if it would become a fight, and then realized that these kids could hardly fight each other when the one who was losing could always fade out.

He leaned over and whispered to Dorothea and Boyd: "Let's sneak up there while the argument's going on."

"But—" Boyd began.

"Less chance of their noticing us," Malone explained, and started forward.

They tiptoed up the stairs and got behind a pile of crates in the shadows, while invectives roared around them. This floor was lit by a single small bulb hanging from a socket in the ceiling. The windows were hung with heavy blankets to keep the light from shining out.

The kids didn't notice anything except each other. Malone took a couple of deep breaths and began to look around.

All things considered, he thought, the kids had fixed the place up pretty nicely. The unused warehouse had practically been made over into an apartment. There were chairs, beds, tables and everything else in the line of furnishings for which the kids could conceivably have any use. There were even some floor lamps scattered around, but they weren't plugged in. Malone guessed that a job would have to be done on the warehouse wiring to get the floor lamps in operation, and the kids just hadn't got around to it yet.

By now, the boys were practically standing toe to toe, ripping air-bluing epithets out at each other. Not a single hand was lifted.

Malone stared at them for a second, then turned to Dorothea. "We'll wait till they calm down a little," he whispered. "Then you go out and talk to them. Tell them we won't hurt them or lock them up or anything. All we want to do is talk to them for a while."

"All right," she whispered back.

"They can vanish any time they want to," Malone said, "so there's no reason for them not to listen to—"

He stopped suddenly, listening. Over the shouting, screaming and cursing of the kids, he heard motion on the floor below.

Cops?

It couldn't be, he told himself. But when he took out his radiophone, his hands were shaking a little.

Lynch's voice was already coming over it when Malone thumbed it on.

". . . So hang on, Malone! I repeat: we heard the ruckus, and we're coming in! We're on our way! Hang on, Malone!"

The voice stopped. There was a click.

Malone stared at the handset, fascinated and horrified. He swallowed. "No, Lynch!" he whispered, afraid to talk any louder for fear the kids would hear him. "No! Don't come up! Go away! Repeat: go away! Stay away! Lynch—"

It was no use. The radiophone was dead.

Lynch, apparently thinking Malone's set had been smashed in the fight, or else that Malone was unconscious, had shut his own receiver off.

There was absolutely nothing that Malone could do.

The kids were still yelling at the top of their voices, but the thundering of heavy, flat feet galumphing up from the lower depths couldn't be ignored for long. All the boys noticed it at about the same time. They jerked their heads round to face the stairway. Malone and his campatriots crouched lower behind the boxes.

Mike Fueyo was the first to speak. "Don't vanish yet!" he snapped. "Let's see who it is."

The internal dissent among the Silent Spooks disappeared as if it had never been, as they faced a common foe. Once again, they fell naturally under Fueyo's leadership. "If it's cops," he said, "we'll give 'em the Grasshopper Play we worked out. We'll show 'em."

"They can't fool with us," another boy said. "Sure. The Grasshopper Play."

It was cops, all right. Lieutenant Lynch ran up the stairs waving his billy in a heroic fashion, followed by a horde of blue-clad officers.

"Where's Malone?" Lynch shouted as he came through the doorway.

"Where's your what?" Mike yelled back, and the fight was on.

Later, Malone thought that he should have been surprised, but he wasn't. There wasn't any time to be surprised. The kids didn't disappear. They spread out over the floor of the room easily and lightly, and the cops charged them in a great blundering mass.

Naturally, the kids winked out one by one—and reformed in the center of the cops' muddle. Malone saw one cop raise his billy and swing it at Mike. Mike watched it come down and vanish at the last instant. The cop's billy descended on the head of another cop, standing just behind where Mike had been.

The second cop, hit and blinded by the blow on his head, swung back and hit the first cop. Meanwhile, Mike was somewhere else.

Malone stayed crouched behind the boxes. Dorothea stood up and shouted: "Mike! Mike! We just want to talk to you!"

Unfortunately, the police were making such a racket that this could not be heard more than a foot or so from the speaker. Lynch himself charged into the mass, swinging his billy and his free fist and laying others out one after the other. Pretty soon the floor was littered with cops. Lynch was doing yeoman duty, but it was hard to tell what side he was on.

The vanishing trick Mike had worked out was being used by all of the kids. Cops were hitting other cops, Lynch was hitting everybody, and the kids were winking on and off all over the loft. It was a scene of tremendous noise and carnage.

Malone suddenly sprang to his

feet and charged into the melee, shouting at the top of his lungs and swinging both fists. The first person he saw was one of the teen-agers, and he charged him with abandon.

He should, he reflected, have known better. The kid disappeared. Malone caromed off the stomach of a policeman, received a blow on the shoulder from his billy, and rebounded into the arms of a surprised police officer at the edge of the battle.

"Who're you?" the officer gasped.

"Malone," Malone said.

"You on our side?"

"How about you?" Malone said.

"I'm a lieutenant here," the officer said. "In charge of warehouse precinct. I—"

Malone and the lieutenant stepped nimbly aside as another cop careened by them, waving his billy helplessly.

They looked away as the crash came. The cop had fallen over a table, and now lay with his legs in the air, supported by the overturned table, blissfully unconscious.

"We seem," Malone said, "to be in an area of some activity. Let's move."

They shifted away a few feet. Malone looked into the foray and saw Boyd at work roaring and going after the kids. One of them had established a kind of game with him. He would appear just in front of Boyd, who rushed at him, arms outstretched. As Boyd had almost reached him, the kid disappeared and reappeared again just behind Boyd. He tapped the FBI agent gently on the shoulder; Boyd turned and the process was repeated.

Boyd seemed to be getting winded.

The lieutenant suddenly dashed back into the fray. Malone looked around, saw Mike Fueyo flickering in and out at the edges, and headed for him.

A cop swung at Mike, missed, and hit Malone on the arm. Malone swore. The cop backed off, looking in a bewildered fashion for his victim, who was nowhere in sight. Then Malone caught sight of him, at the other edge of the fight. He started to work his way around.

He tried to avoid blows, but it wasn't always possible. A reeling cop caught his lapel and tore it, and Lynch, indefatigable in battle, managed to graze his chin with a blow meant for one of the disappearing boys. Other cops were battling each other, going after the kids and clutching empty air, cursing and screaming unheard orders in the fracas.

Malone ducked past Lynch, rubbed at his chin and looked for Mike. In the tangle of bodies it was getting hard to see. There was the sound of breaking ceramics as a floor lamp went over, and then a table followed it, but Malone avoided both. He looked for Mike Fueyo—

A cop clutched him around the middle, out of nowhere, said: "Sorry, buddy, who are you?" and dove back into the mass of bodies. Malone caught his breath and forged onward.

There was Mike, at the edge of the fight, watching everything coolly. No cop was near him. In the dim light the place looked like a scene from Hell, a special Hell for policemen. Malone wove through battling hordes to the edge and came out a few feet away from Mike Fueyo.

Fueyo didn't see him. He was looking at Boyd instead—still stumbling back and forth as the teen-ager baiting him winked on and off in front of him and behind him. He was laughing.

Malone came up silently from behind. The trip seemed to take hours. He was being very quiet, although he was reasonably sure that even if he yelled he wouldn't be heard. But he didn't want to take the slightest chance.

He sprang on Mike and attached

the handcuffs to his wrist, and to Mike's wrist, within seconds.

"Ha!" he said involuntarily. "Now come with me!"

He gave his end of the handcuffs a tremendous yank.

He started to stagger, trailing an empty cuff behind him, flailing his arms wildly. Ahead of him he could see a big cop with an upraised billy. Malone tried to alter his course, but it was too late. He skidded helplessly into the cop, who jerked round and swung the billy automatically. Malone said: "Yi!" as he caught the blow on the cheekbone, bounced off the cop and kept going.

He careened past a blur of figures, trying to avoid hard surfaces and other human beings. But there was—

Oh, no, Malone thought.

Lynch.

Lynch was ready to swing. His fist was cocked, and he was heading for one of the teen-agers with murder in his eye. Malone knew their paths were going to intersect. "Watch out!" he yelled. "Watch out, it's me! Stop me! Stop me! Somebody stop me!"

He went completely unheard.

Lynch swung and missed, hitting a cop who had been hiding behind the teen-ager. The cop went down to join the wounded, and Lynch roared like a bull and swung around, looking for more enemies.

That was when Malone hit him.

Long afterward, he remembered Lynch's hat sailing through the air, and landing in the center of a struggling mass of policemen. He remembered Lynch saying: "So there you are!" and swinging before he looked.

He remembered the blow on the chin.

And then, he remembered falling, and falling, and falling. Somewhere there was a voice: "Where are they? They've disappeared for good."

And then, for long seconds, nothing.

He woke up with a headache, but it wasn't too bad. Surprisingly, not much time had passed; he got up and dusted off his trousers, looking around at the battlefield. Wounded and groaning cops were all over. The room was a shambles; the walking wounded—which comprised the rest of the force—were stumbling around in a slow, hopeless sort of fashion.

Lynch was standing next to him. "Malone," he said, "I'm sorry. I hit you, didn't I?"

"Uh-huh," Malone said. "You seemed to be hitting everybody."

"I was *trying* for the kids," Lynch said.

"So was I," Malone said. "I got the cuffs on one and yanked him along—but he disappeared and left me with the cuffs."

"Great," Lynch said. "Hell of a raid."

"Very jolly," Malone agreed. "Fun and games were had by all."

A cop stumbled up, handed Lynch his cap and disappeared without a word. Lynch stared mournfully at it. The emblem was crushed and the cap looked rather worn and useless.

He put it on his head, where it assumed the rakish tilt of a hobo's favorite tam-o'-shanter, and said: "I hope you're not thinking of blaming *me* for this fiasco."

"Not at all," Malone said nobly. He hurt all over, but on reflection he thought that he would probably live. "It was nobody's fault." Except, he thought, his own. If he'd only told Lynch to come in when called for—and under no other circumstances—this wouldn't have happened. He looked around at the remains of New York's Finest, and felt guilty.

The lieutenant from the local precinct limped up, rubbing a well-kicked shin and trying to disentangle pieces of floor lamp from his hair. "Listen, Lynch," he said, "What's with these kids? What's going on here? Look at my men."

"Some days," Lynch said, "it just doesn't pay to get up."

"Sure," the local man said, "but what do I do now?"

"Make your reports."

"But—"

"To the Commissioner," Lynch said, "and to nobody else. If this gets into the papers, heads will roll."

"My head is rolling right now," the local man said. "Know what one of those kids did? Stood in front of a floor lamp. I swung at him and he vanished. Vanished. I hit the lamp, and then the lamp hit me."

"Just see that this doesn't get out," Lynch said.

"It can't," the local man said. "Anybody who mentioned this to a reporter would just be laughed out of town. It's not possible." He paused thoughtfully, and added: "We'd all be laughed out of town."

"And probably replaced with the FBI," Lynch said morosely. He looked at Malone. "Nothing personal, you understand," he said.

"Of course," Malone said. "We can't do any more here, can we?"

"I don't think we can do any more anywhere," Lynch said. "Let's lock the place up and leave and forget all about it."

"Fine," Malone said. "I've got work to do." He looked round, found Dorothea and signaled to her. "Come on, Dorothea. Where's Boyd?"

"Here I am," Boyd said, walking slowly across the big room to Malone. He had one hand held to his chin.

"What's the matter with you?" Malone asked.

Boyd took his hand away. There was a bald spot the size of a quarter on the point of his chin. "One of those kids," he said sadly, "has a hell of a strong grip. Come on, Miss Fueyo. Come on, Malone. Let's get out of here."

XV.

It is definitely not usual for the Director of the FBI to come stalking into a local office of that same FBI without so much as an advance warning or a by-your-leave. Such things are simply not done.

Andrew J. Burris, however, was doing them.

Three days after the Great Warehouse Fiasco, a startled A-in-C looked up to see the familiar Burris figure stalk by his office, growling under its breath. The A-in-C leaped to the interoffice phone, wondered whom he ought to call first, and subsided, staring dully at the telephone screen and thinking about retiring.

The next appearance of the head of the FBI was in the office assigned to Malone and Boyd. Burris came through the doorway without warning, his countenance that of a harried and unhappy man.

Malone looked up, blinked, and then readjusted his features to what he imagined was a nice, bright smile. "Oh," he said. "Hello, chief. I've been sort of expecting you."

"I'll bet you have," Burris said. He set his brief case on Malone's desk and pulled a sheaf of papers from it. "Do you see these?" he said, waving them. "Inquiries. Complaints. Demands. From everybody. I've been getting them for three days."

"Sure are a lot of them," Malone said at random.

"From Police Commissioner Fernack," Burris said. "From the mayor. From the governor, in Albany. From everybody. And they all want an explanation. They demand one."

He sat down suddenly on Malone's desk, his anger gone.

"Well—" Malone began.

"Malone," Burris said plaintively, "I can stall them off for a while. I can tell them all kinds of fancy stories. I don't mind. They don't really need any explanation. But—" He paused, and then added: "I do!"

Malone closed his eyes, decided things looked even worse that way, and opened them again. "Just what sort of an explanation did you have in mind, chief?" he said.

"Any kind," Burris said instantly, "so long as it explains. I . . . no."

"No?"

"No," Burris said. "I want the truth! Even if it doesn't explain anything! Preferably, I want both—the truth and some explanations. If possible. For three days, now, this area has been haunted by the Silent Spooks. They've been stealing everything they could carry off! They've got the whole city in an uproar!"

"Well," Malone said. "Not exactly. The papers—"

"I know," Burris said. "You've kept it out of the news. That's fine, and I appreciate it, Malone. I really do. But I can't sit around and appreciate it much longer. You've got to get those boys!" He bounced off the desk and stood up again. "The longer they keep this up," he said, "the harder it's going to be to square everything with the courts. Those kids may end up getting killed! And how would that be?"

"Terrible," Malone said honestly.

"Something," Burris summed up, "has to be done."

Malone thought for a second. "Chief," he said at last, "if you can think of any way to nab them, I'll certainly be grateful."

"Oh," Burris said. "Oh. No. No, Malone. This is your baby." He leaned over and clapped Malone on the shoulder. "I have faith in you," he said. "You cleared up that nutty telepath case and you can clear this one up, too. But you've got to do it soon!"

"I'm working on it," Malone said helplessly. "We might get a lead any time now."

"Good," Burris said. "Meanwhile, let's sit down and see if we can't figure out a way to pacify the local bigwigs."

Malone sighed wearily.

An hour later, he was even more tired. Letting himself into his room at the hotel, he felt completely exhausted. He had spent most of the hour tactfully trying to get away from Burris. It had not been the world's easiest job.

Dorothea Fueyo was sitting on the couch, waiting for him.

Immediately, he felt much better.

"You're late," Dorothea said accusingly. "I had to come up with the duplicate key you gave me. And what are the bellboys going to think?"

"They're going to think you had a duplicate key," Malone said. "Anyhow, I'm sorry. I got delayed at the office. Burris came to town—delivering seventeen ultimatums, forty-nine conflicting sets of orders and a rousing lecture."

"I could have come up to your office, then," Dorothea said, "instead of compromising my reputation by sneaking up to your hotel room."

"And what about *my* reputation?" Malone said. "Besides, the office is no place for what I have in mind."

"Why, Mr. Malone!"

Malone ignored the comment. "Did you bring the notebook?" he said.

"Certainly." Dorothea handed a black, plastic-bound notebook over to Malone. "But what's all this with a notebook? Going to keep score?"

"Not exactly," Malone said. He took the notebook and leafed through it idly. It was not Mike Fueyo's book; the boy himself had that now, and there was little chance of getting it back again. This one belonged to Dorothea—but, Malone thought, it could serve the same purpose.

"What I have in mind," he said, "is something Mike said the other night, just before the cops barged in. He said something about having tried to teach you the Vanish. And that's why I asked you to come here. Did he teach you?"

"Well, he tried," Dorothea said. "But I couldn't do anything with it. I haven't got the Talent, Mike says." She paused. "Is that why you figured I had a notebook like his?"

"Sure," Malone said. "It's the only thing that makes sense. Mike's notebook was full of symbols—and that was all they could be. Symbols. If you see what I mean."

"Not exactly," Dorothea said.

"Symbolism—anyhow, that's what Dr. O'Connor says—is one of the

primary factors in psionics."

"Dr. . . . oh, yes," Dorothea said. "Westinghouse. I've heard about him."

"Good," Malone said. "Anyhow, I decided the pictures in Mike's notebook were just that—symbols. Things he wanted. And the little squiggles after the names were symbols, too. You know," Malone said, "the boy's pretty smart. Nobody else that I know of has ever figured out a way to teach psionics—at least, not on that level. But Mike has."

"He's a good boy," Dorothea said. "Basically."

"Fine," Malone said. "Anyhow, if that were true, then the notebook was some sort of guide. And if he tried to teach you the technique, then you had to have a notebook, too. Clear?"

"Perfectly," Dorothea said, "so what do you want me to do?"

"Teach me," Malone said.

There was a silence.

"That's silly," Dorothea said. "How can I teach you something I can't do myself? Besides, how do you know you have the Talent?"

"As far as the second question goes, I don't know. But I can try, can't I? And as far as the first question goes, that might not be so simple. But I think it can be done—if you remember what Mike tried to teach you."

"Oh, I can remember all of that," she said, "but it's just that it didn't do me any good. I couldn't use it."

"A man who's paralyzed from the waist," Malone said hopefully, "can't play football. But if he knows how the game's played, he can teach others—anyhow, he can teach the fundamentals. Want to try?"

Dorothea smiled. "All right, Ken," she said. "It's a great idea, at that: the blind teaching the possibly-blind to read. Give me the notebook, and I'll explain the first principles. Later, you'll have to get a notebook of your own, because these symbols are very personalized."

Malone grinned and pulled a black book from his pocket. "I thought they might be," he said. "I've already got one. Let's go."

Sweating, Malone stared grimly at the picture he had drawn on a page of his notebook. He'd been trying the stunt for four days, and so far all he had achieved was a nice profusion of perspiration. He was beginning to feel like an ad for a Turkish bath.

"No, Ken," Dorothea said patiently. "No. You can't do it that way. You've got to *visualize* it. That's how Mike could find red Cadillacs so easily. All he had to do was—"

"I know," Malone said, impatiently. "That's what the pictures are for. But I'm no artist. This doesn't even look much *like* my office."

"It doesn't have to, Ken," Dorothea said. "All it has to do is give you enough details to enable you to visualize your destination. The better your memory is, the less detail you need. But you've got to grasp the whole area in your mind."

Malone lifted his eyes from the

book and stared into the darkness outside the window without seeing it. Midnight had come and gone a long time ago, and he was still working.

"If I don't crack this case pretty soon," he muttered, "Burris is going to find a special new assignment for me—like investigating the social life of a deserted space station."

"Now, that's just what's bothering you," Dorothea said. "Get your mind off Burris. You can't teleport when your mind is occupied with other things."

"Then how did the kids hop around so much during the fight at the warehouse?"

"Plenty of practice," Dorothea said. "They've been doing it longer than you have. It's like playing the piano. The beginner has to concentrate, but the expert can play a piece he's familiar with and hold a conversation at the same time. Now stop worrying—and start concentrating."

Malone looked at the book again. With an effort, he forced everything out of his mind except the picture. Burris' face came back once or twice, but he managed to get rid of it. He looked at the lopsided drawings that represented various items in the room, and made himself concentrate solely on visualizing the objects themselves and their surroundings.

Then, as the picture became clearer and achieved more reality, he began going over the other mental exercises that Dorothea had taught him.

He heard a clock tick.

It was gone.

There was nothing but the picture, and the room it stood for . . . nothing . . . nothing . . .

The lights went out.

Malone blinked and jerked his head up from the notebook. "What hap—" he began.

And then he stopped.

He was no longer in his hotel room at the Statler-Hilton. He was standing in the middle of his office at FBI headquarters, Washington, D. C.

It had worked!

Malone walked over to the wall switch and turned on the lights in the darkened room. He looked around. He was definitely in his office.

He was a teleport.

He blinked and wondered briefly if he were dreaming. He pinched himself, said: "Ow," and decided that the pain offered no certain proof.

But he didn't feel like part of a dream.

He felt real. So did the office.

Just as he had promised Dorothea, he went to the phone and dialed the Statler-Hilton.

It took a minute for the long-distance circuits to connect him with Manhattan. Then the pretty operator at the hotel was smiling at him from the screen. "Statler-Hilton Hotel," she said. "May we help you?"

"Ring Room 814," Malone said. "I'm probably asleep in it."

"What?" the operator said.

"Never mind," Malone said. "Just ring it."

"Yes, sir." The screen went blank.

The screen stayed blank for a long time.

And then the operator was back. "I'm sorry, sir," she said. "That room doesn't answer."

"You're sure?" Malone said.

"Certainly."

"Try it again," Malone said.

The operator did so. She returned with the same answer.

Malone frowned and hung up. It didn't sound right. Even a dream was supposed to make more sense than this was making. There was something wrong.

He had to get back to the hotel room.

There was only one trouble. He didn't have a picture of the room in his notebook.

Dorothea had said that it was almost impossible to go to a place one hadn't been to before. Mike Fueyo had been able to pick up any red Cadillac in the city because he'd concentrated solely on the symbol of a red Cadillac. But he never knew which Cadillac he'd end up at.

Malone closed his eyes and tried to remember the hotel room. He half-wished he had a photograph of it, but Dorothea had told him that photos wouldn't work. They were too complete; they required no effort of the mind. Only a symbol would do.

Of course, the job could be done without a symbol by somebody who'd had plenty of practice. But Malone

had made exactly one jump. Could he do it the second time with nothing to work with except his own recollection and visualization of the room?

He didn't know, but he was certainly going to try. He had to.

Something was wrong; something had happened to Dorothea.

He tried to imagine what it could be, and then realized that such thoughts were only delaying him by distracting his mind from its main job.

He kept his eyes tightly closed and tried to form the picture in his mind. The couch—there. The dresser—over there. The easy-chair, the rug, the walls, the table—wait a minute: he was losing the couch. There. Now. The table, the desk—all there. In color. And in detail.

Slowly they came, and he held them in place, visualizing his hotel room just as he had visualized his office minutes before. He concentrated. Harder. Harder. *Harder*. HAR—

"Sir Kenneth!" a voice said. "Will you please stop standing there with your eyes closed and help me with this poor child? She's fainted."

Malone's eyes popped open, but for a minute he wasn't entirely sure he'd opened them. His visualization blended almost perfectly with the reality of the room around him. There was only one jarring difference.

He had certainly never visualized the richly-dressed figure of Queen Elizabeth I standing in the center of the room.

"Now, now," she said. "Thinking like that can only lead to confusion. Come over here and help me."

Dorothea was on the couch. Between them, they managed to wake her gently, and she sat up and stared around at them and the room. "I'm sorry," she said dazedly. "It's just that I didn't expect you to turn into a little old lady in Elizabethan costume. Just a bit disconcerting." She blinked. "By the way, who is she?"

"This," Malone said with a sense of some foreboding, "is Queen Elizabeth I."

"She's dead," Dorothea said decisively.

"Not really, my dear," the Queen said. "Actually, you see . . . well, it's too long to explain now." She gave everybody a bland smile.

"She's nuts, then," Dorothea said. "She is nuts, isn't she? Because if she isn't, I am."

"You're not crazy," Malone told her diplomatically. "But she—" He stopped. How could he explain everything, in front of the Queen herself?

"Don't worry about it," Her Majesty said. "Dorothea is a little confused—but it hardly matters. Perhaps there are other things to do."

"Sure," Malone said uncertainly. "By the way, how did you get here?"

"Now, why do you ask that?" the Queen said. "You've already figured it all out, Sir Kenneth."

"I don't get it," Dorothea put in.

"Simple," Malone said. "She's telepathic. She's been listening in on our sessions for the past four days—she must have been. So now she can teleport, too."

Dorothea looked at the little old lady in awe. "But how could you come to a place you'd never been to before?"

"I got all the information I needed, my dear, out of Sir Kenneth's mind."

"Sir Kenneth?" Dorothea said. "Sir . . . Ken? His mind?"

"Never mind it," Malone said. "What do I do now?"

Her Majesty said: "Don't worry about anything. And use your own psionic talents. You can catch those dear boys now, you know. You're better than they are."

"Me?" Malone said. "But they've had—"

"Practice, of course," the Queen said. "But you have a talent they don't."

"I do?"

"Well," the Queen said, "you've been calling it 'luck' for years. You're much too modest, Sir Kenneth. If you'll think back, you'll remember that every time you had a bit of your so-called luck, it was because you were at the right place at the right time. There's no other way to explain the fact that you wandered at random through Greenwich Village—of all places!—and just happened to end up at the very same red Cadillac that young Mike was going to come to—*before he got there!*"

Malone felt the back of his head. "That," he said, "was luck?"

"You got the notebook, didn't you?" the Queen said. "But of course it wasn't luck. It's prescience—the ability to predict the future. You've had it all along, but you haven't been consciously using it. The only way you'll ever catch those boys is to know where they're going to be before they get there."

Malone sat down heavily on the couch next to Dorothea. His mind was whirling with a fine, dizzy rapidity. In a few seconds he was going to try and grab the brass ring.

"Oh, I'll help you," the Queen added. "Don't worry about that. I think I can pick up Mike's mind, now that I'm closer to him. And if we can figure out what their plans are, and where they're going to be, we can nab them all, Sir Kenneth. Won't that be nice?"

"Ducky," Malone said. "Simply ducky. All I have to do is predict the future while you read minds and we both teleport. And Dorothea can sit around sticking pins in dolls, I guess. Or—"

"Well, now," the Queen said, "I don't know. Perhaps she just doesn't have that talent. Besides, why would we want to do anything like that? It seems to me—"

"Never mind," Malone said hopelessly. "If we're going to do anything, let's get started."

Twelve hours later, Kenneth J. Malone was sitting quietly in a small room at the rear of a sporting-goods

store on upper Madison Avenue, trying to remain calm and hoping that the finest, most beautiful and complete hunch—only now it wasn't a "hunch" any more, he reminded himself; now it was prescience—was going to pay off. With him were Boyd and two agents from the Sixty-ninth Street office. They were sitting quietly, too, but there was a sense of enormous excitement in the air. Malone wanted to get up and walk around, but he didn't dare. He clamped his hands in his lap and sat tight.

They waited in silence, not daring to talk. There wasn't a sound in the room. Malone felt like screaming, but he managed to control himself with an effort.

There was no reason why the plan shouldn't work, Malone told himself. According to all the theory he knew, it was fool proof. Her Majesty had no doubts about it, either. She assured him that he had prescience, and several other powers as well. Unfortunately, Malone wasn't quite as sure as she was.

Even if the theory seemed to back her up, he thought, there was still a chance that she was wrong, and the theory was wrong, and everything was wrong. His hunch—prescience, if you wanted to call it that, he amended—said definitely that this would be the place the Spooks would hit tonight. Her Majesty was quite sure of it. And Malone couldn't think of a single really good reason why either of them might be wrong. But maybe he'd got the address mixed up. Maybe the Spooks were somewhere else right now, robbing what they pleased, safe from capture—

It doesn't do much good to know where a teleporter *is*, Malone thought. But it's extremely handy to know where he's going to be. And if you also know what he plans to do when he gets where he's going, you've got an absolute lead-pipe cinch to work with.

The Queen and Malone had provided that lead-pipe cinch. They were sure that Mike planned to raid the sporting-goods store with the rest of the Spooks that night.

But, of course, they might all just be riding for some kind of horrible, unforeseen fall—

The main part of the sporting-goods store was fairly well lit, even at night, though it was by no means brightly illuminated. There were show-window lights on, and the street lamp from outside cast a nice glow. Malone was grateful for that. But the back room was dark, and the four men there were well-concealed. A curtain closed the room off, and Malone watched the front of the store through a narrow opening in it. He stared until his eyes ached, afraid to blink in case he missed the appearance of the Spooks. Everything had to go off just right, precisely on schedule.

And it was going to happen any minute, he told himself nervously. In just a few minutes, everything would be over.

Malone held his breath.

Then he saw the figure walk slow-

ly by the glass front of the shop, looking in with over-elaborate casualness. He was casing the joint, making sure there was no one left in it.

Mike Fueyo.

Malone tried to breathe, and couldn't.

Seconds ticked by.

And then—almost magically—they appeared. Eight of them, almost simultaneously, in the center of the room.

Mike Fueyo spoke in a low, controlled voice. "O.K., now," he said. "Let's move fast. We haven't got much time. We—"

And that was all he said.

Malone concentrated on just one thing: holding an image of the room, with the eight Spooks in it.

There was a long second of silence.

Malone felt a bead of sweat trickle down his cheek. He held the image.

"What's wrong?" the tallest boy said suddenly—Ramon Otravez, Malone remembered. "What's wrong, Mike?"

Mike let out his breath in a ragged sigh. "I . . . don't know," he said slowly. "I can't move—"

"It's a trap!" another boy shouted.

Malone bore down. He could feel power draining out of him, but he held on, willing the boys to remain in the room, blanking out their own teleportative abilities with his stronger ones.

The eight boys stood, frozen, in the center of the lit room.

Malone let another second go by, and then he stepped out from behind the curtains.

"Hello, boys," he said casually.

Mike stared at him. "It's Malone," he said.

"That's right," Malone said. "Hello, Mike. I've been waiting for you."

Mike gulped. "You found us," he said. "Somebody talked."

Malone shook his head. "Nobody talked," he said. Concentration was getting easier; the longer the situation remained the same, the less power it took to keep it that way. He wished he had brought a cigar, and compromised by fishing out a cigarette and lighting it.

Mike said: "But—" and was silent.

"I knew where you were going to be," Malone said. "You see, I've got a few—powers of my own, Mike."

Ramon Otravez said: "He's kidding. It's some kind of a trick."

"Shut up," Mike told him.

"It's no trick," Malone said. "I've been waiting for you for quite a while, boys." He paused. "And you can't move, can you? I've taken care of that."

"Some kind of gas," Mike said instantly.

"Gas?" Malone said. "Nope." He shook his head.

"Electricity," Mike said. It sounded desperate. "Some gimmick you've got set up back there behind the curtain, to—"

"No gimmick," Malone said. "It's just that I know a couple of tricks,

too—and I'm a little better at them than you are." The next minute was going to be difficult, he knew, but it had to be done. He "froze" the picture of the room in his mind and, at the same time, pictured himself at the other side of the room. He made the effort, and at first nothing happened. Then—

"You can do the Vanish," Mike said, very slowly and softly.

"Oh, I can do more than that," Malone said cheerfully from the other side of the room. "I can do the Vanish, and I can also keep you from doing it. Right?"

It hung in the balance for a second, but Malone was barely worried about the final outcome. He'd beaten the boys, not with scientific gadgetry or trickery, but at their own game. He'd done it simply, easily and completely. And for boys who were sure they were something very special, boys who'd never been beaten on their own grounds before, the shock was considerable.

Malone knew, even before Mike said: "I guess so," in a defeated voice, that he had won.

"Now," he said briskly, "you boys are going to come down to the FBI offices with me. And you're not going to try any tricks—because you can't get away with a thing, and you know you can't. I've just proven that to you."

"I guess you have," Mike said.

Malone beckoned the three other men out of the back room and then, under his watchful guidance, the procession started for the street.

XVI

"The only thing we had to worry about," Malone said, pouring some more champagne into the hollow-stemmed glasses, "was whether the theory would actually prove out in practice. From all we knew, it seemed logical that I could concentrate on the room with the boys in it, and by that concentration prevent them from teleporting out—but there's a lot we don't know, too. And it didn't damage the kids any."

Dorothea relaxed in her chair and looked around at the hotel room walls with contentment. "Mike seemed pretty normal—except that he had that awful *trapped* feeling."

Malone handed her one of the filled glasses with an air. He was beginning slowly to feel less like the nervous, uncertain Kenneth J. Malone and more and more like good old Sir Kenneth Malone. "I can see why he felt trapped," he said. "If a guy's been unhampered by four walls all the time, even for only a year or so, he's certainly going to feel penned in when he's stopped from going through them. Especially when what stops him is just what he has—only more of the same. It might be a little ego-crushing, and just a trifle claustrophobic."

"The main thing is," Dorothea said, "that everybody's so happy. Commissioner Fernack, even—with Mr. Burris promising to give him a medal."

"And Lynch," Malone said reflectively. "He'll get a promotion out of

this for sure. And good old Kettleman."

"Kettleman," Dorothea said. "Oh, sure. He's some kind of social worker, isn't he? Only we never knew what kind."

"And now he's getting a scroll from the FBI," Malone said. "A citation for coming up with the essential clue in this case. Even though he didn't know it *was* the essential clue. You know," he added reflectively, "one thing puzzles me about that man."

"Yes?"

"Well," Malone said, "he worked in your neighborhood. You knew him."

"Of course I did," Dorothea said. "We all knew Kettleman."

"He said he had a lot of success as a social worker," Malone said. "Now, I've met him. And talked with him. And I just can't picture—"

"Oh," Dorothea said. "We keep him around—kept him around, I mean—as a sort of joke. A pet, or a mascot. Of course, he never did catch on. I don't suppose he has yet."

Malone laughed. "Nope," he said. "He hasn't."

"Mike," Dorothea said.

"Mike what?"

"Mike," she repeated. "He's probably the happiest of all. After Mom and I talked to him for a while. anyhow, and he began to . . . to get used to things. Now he's excited about being an FBI man." She looked worriedly at Malone for a second. "You weren't kidding about that, were you?" she asked.

She looked very pretty when she was worried, Malone decided. He leaned over and kissed her with great care. After a while he said: "You were saying?"

"Was I?" Dorothea said. "Oh, yes. I was. About Mike being an FBI man."

"Oh," Malone said. "Well, normally you've got to be a lawyer or an accountant, but there are a few special cases. And maybe Mike would fit in to the special-case bracket. If he doesn't—well, he'll be doing some kind of official work for the Government."

"What about Her Majesty, or whatever she is?" Dorothea asked. "Is she—convinced that teleportation's no good, the way Mike is?"

Malone looked unhappy. "I wish you hadn't mentioned it," he said.

"Then what will you do?" Dorothea said.

"Burris has it all down pat," Malone said bitterly. "Since I'm the only one who can predict where she's going to be, I'm going to be her permanent bodyguard from now on. She's promised me that she won't go teleporting all over the place—but we won't be able to keep her locked up all the time, either. So: whither she goes, I go—first."

"Well," Dorothea said, "don't feel bad. After all, you did what you set out to do."

"I suppose so," Malone said.

"Sure you did," Dorothea said.

"You got the boys. And they won't feel so bad after they get used to it."

"I suppose not," Malone said. "We had to prove one thing to them, anyway. We can stop them at any time. You see, they've got to think about teleporting, and as soon as they do that one of our telepaths—like Her Majesty or me, I guess—will know what they're thinking. And we can 'freeze' them. I mean, I can."

"It sounds all right," Dorothea said.

"Sure," Malone said. "After all, we did them quite a favor—getting them out of all the trouble they'd gotten themselves into."

"That reminds me, Ken," Dorothea said. "All the things that were stolen. The liquor and all of that. Money. What's going to happen to that?"

"Well," Malone said, "everything that can be returned—and that includes most of the liquor, because they hadn't had a chance to get rid of it to the bootleggers around this area—will be returned. What can't be returned—money, stuff they've used, broken or sold—well, I don't exactly know about that. It might take a special act of Congress," he said brightly.

"All for the boys?" Dorothea said.

"Well, they'll be at Yucca Flats," Malone said, "and they'll be pretty useful. And, as I said before we started all this, if they try to run away from Yucca Flats we'll just have to keep them 'frozen' all the time. I mean, I will. Little as we want to. They can be of some use that way, too. The Government isn't doing all this for nothing."

"But keeping them 'frozen'—"

"I said we didn't want to do it. And I don't think we'll have to. They'll be well taken care of, don't worry. Some of the best psychiatrists and doctors are out there. And Mike and the others—if they can show they're trustworthy—can come home every week end, or even every night if they can teleport that far." Malone paused. "But it isn't charity," he added. "We need people with specialized psionic abilities—and, for a variety of reasons, they're pretty hard to find."

"You know," Dorothea said, "you're pretty wonderful, Mr. Malone."

Malone didn't answer her. He just kissed her again.

Dorothea pushed him gently away. "I'm envious," she announced. "Everybody gets a reward but me. Do I get left out just because I swiped your notebook?"

Malone kissed her again. "What kind of a reward do you want?"

She sighed. "Oh, well," she said. "I suppose this is good enough."

"Good enough?" Malone said. "Just good enough?"

His lips met hers for the fifth time. She reached one hand gently out to the light switch and pushed it.

The lights went out.

THE END

THE REFERENCE LIBRARY

By P. SCHUYLER MILLER

TWO FROM THE TWENTIES

I THINK most old-timers, at least, would consider the Twenties one of the great ages of science fiction. In it *Amazing Stories* and *Weird Tales* were born and this magazine was conceived; Hugo Gernsback showed his continued durability by launching *Science Wonder Stories* almost as soon as he had lost control of *Amazing*.

These were the years when Edgar Rice Burroughs—practically a school of writing in himself—was doing what many consider his best work, and then Ralph Milne Farley and Otis Adelbert Kline were trying to beat him at his own game. Ray

Cummings was just starting to become popular. So was A. Merritt and, in the book field, "John Taine" (Dr. E. T. Bell. The great names of the Munsey-dominated past—Garrett Smith, Philip M. Fisher, Austin Hall, Homer Eon Flint, Francis Stevens, George Allen England—were appearing for the last time, but new names such as H. P. Lovecraft, Edmond Hamilton, and E. E. Smith were taking their places.

Only a few writers from those days are still active, and they have been primarily associated with the fantasy field. Murray Leinster spans the gap more successfully than anyone, but Edmond Hamilton, "Skylark" Smith, Frank Belknap Long, August Derleth, and Clark Ashton Smith are still important names in our field, if not often in this magazine.

In the Twenties science fiction and fantasy were still a part of the main body of literature. They hadn't segregated themselves and begun to hold revival meetings and proselyte for converts. Even so, *Blue Book*, the Munsey magazines, Hugo Gernsback's popular science periodicals, and a few others had begun the labeling process, and I suspect that few of the regular readers of these magazines, no matter how eagerly they awaited the next adventures of John Carter on Barsoom or some monosyllabic hero among Hamilton's galaxies, paid much attention to what was going on in more "literary" circles.

Two novels that enjoyed a certain success and acclaim in those days have been reprinted in "upper-crust" paperbacks format—that is, out of the thirty-five cent rack where we expect to find our typical science-fiction reprints and originals. One is dated; one may turn out to be timeless.

"The Eater of Darkness," by Robert M. Coates, now of the *New Yorker* staff, was originally published by Macauley in 1926; the Capricorn Books reprint, from G. P. Putnam's Sons, is $1.15—it is CAP 18, if you have to order by mail. It was called "the first Dadaist novel," although that ancestor of surrealism had "faded out," as the encyclopedias have it, some years earlier. It was, and is, a kind of private joke, brewed up out of the Paris background that produced Gertrude Stein and James Joyce. It burlesqued, by ultra-exaggeration, the mad scientist thriller of the day, with its international criminal of many names, whose "Dead Plane" —a death ray cum E. E. Smithian spy ray—can see through solid objects, at practically any distance, and fry the brains of a victim on whom it is focused. Charles Dograr, its Dadaist beatnik of a hero, is drawn into the evil old man's piecemeal decimation of New York, and the whole stew of crime, love, lust, homosexuality, and parodied "working girl" romance progresses through a tangle of Steinlike stream-of-consciousness musing of the sort that Alfred Bester occasionally handles well.

The newspapers of the day re-

viewed it seriously—which they would not now do—and confusedly. The *Evening Post* thought it "one of the cleverest tours-de-force ever contrived by the pen of a wit." *The Nation* rated it "One of the most amusing novels of the season." But the *Saturday Review of Literature* snapped: "Madness, unless it be touched by some saving genius, is quite out of place in any novel."

The *New York Times,* as usual, had what I consider the final word for our time as well as that, when it said that "the dada manner . . . cannot really be burlesqued, since formally at least there is no difference between the real and the imitation variety." Dadaism devoted itself to making sense where sense is expected. "The Eater of Darkness" was a burlesque of a burlesque, that probably had all sorts of hidden meanings for the Greenwich Village set of the time—just as the puns, quips, and multi-entendre allusions in fanzines and at conventions have for our SF-fantasy world—but they were lost on the outsider and they are dated for us.

Quite another matter is Eugene Zamiatin's "We," a precursor and perhaps inspirer of Orwell's "1984." This vision of a bleak totalitarian future was the work of a Russian writer whose satiric gifts kept him equally in the bad graces of the Czarist regime and its Bolshevik successors. "We" was banned in Russia; E. P. Dutton brought out an English edition here in 1924—the first anywhere—and went on into other languages. Finally Russian emigres in Prague serialized a Russian-language version, supposedly translated from the Czech, and the Communist press began snarking at Zamiatin's heels, as it did recently at Boris Pasternak's, with the appearance of "Doctor Zhivago." Zamiatin and his family were, however, allowed to leave Russia, and he died in Paris in 1937. His works are still banned behind the Iron Curtain. Now Dutton has reprinted the book as Everyman Paperback D-39, for $1.45.

"We" is an indictment of totalitarianism and what it does to people, of a sort that we now find more familiar, since we have seen more of it than the post-Victorians of the Twenties. In the far future, after a war has ruined Civilization and Man alike, the people of the United State, neatly numbered and lettered, their every minute regimented and ordained, are living in glass cities, behind green glass walls that shut out the unsequestered world. The narrator, D-503, is the builder of a spaceship that will carry the perfect gospel of the State to other planets; Zamiatin was a ship designer who had a chance to develop his love for writing when he was exiled by the Petrograd Secret Service.

The story of "We" is the story of the ideological seduction and confusion of D-503 by a woman of the underground I-330, who is everything the State is not. She tempts him with strange ideas as well as with herself; she takes him beyond

the impassable glass wall to see the strange furred beings that are the survivors of unregimented Mankind, and suggests that his own hairiness may be evidence of some past miscegnation, and that the taint of nonconformity is born in him.

D-503 tells his story through a series of "records" or diary entries—forbidden in themselves—in which we see the grimness of his world long before he does, and know what is haunting him as he never does. His growing unease, developing into dissatisfaction and even rebellion against the State, is more subtly handled than is the temptation in "1984"—Orwell told a better story, but never made the inner torment of his hero quite so real as Zamiatin's chronicle of the disintegration of a Party man, once he is beset by doubt.

In 1924, "We" was an open indictment of the seven-year-old Bolshevik regime. Through his satire Zamiatin was warning it that it was carrying on the same traditions that he had attacked in the Czarist regime, and that unless it changed its revolution would be no revolution at all, but merely a change in authority. In our time, thirty-five years later, the book is still an indictment of Soviet Russia, which did not heed its warning, but also of the authoritarian philosophy wherever it appears. It may have been no accident that Zamiatin lived in "the United State."

Of these two books of the Twenties, both are peculiarly a part of their time, but "We" is also universal where "The Eater of Darkness" is a dated prank.

* * *

There's good news from Advent: Publishers of P. O. Box 9228, Chicago 90, Illinois. "In Search of Wonder," the volume of critical essays on science fiction by damon knight, has been reprinted and is available again at $4.00. And another book of knight critiques, "Knight on Science Fiction," is in preparation. It will cost only $3.50 if you order before publication. You may still have time to get it. As soon as I do, you'll hear about it.

ECHO IN THE SKULL, by John Brunner

ROCKET TO LIMBO, by Alan E. Nourse. Ace Books, N. Y. No. D-385. 1959. 94 + 162 pp. 35¢

The reprint part of this Ace Double is one of the better Nourse novels, in which the good ship *Ganymede* hunts for—and finds—a potent race of aliens on the grim world of Wolf IV. Here's unabashed space adventure, handsomely handled.

The new bit is a too-short "novel" that ran as a one-shot in No. 36 of the English *Science Fantasy*, and it, too, is good and suspenseful entertainment. Its heroine, Sally Ercott, finds herself "remembering" all sorts of impossible experiences on other worlds. She also finds herself somehow involved with a thoroughly nasty landlord, and—fortunately—with a

competent young inventor who allows his imagination and his intelligence to work as a team. All of the seemingly incongruous bits and pieces are nicely fitted together before it's over. There's a helpful Australian who is rather wasted, and a very pleasant Scotland Yard inspector along toward the end.

Ted Carnell has dedicated his three magazines to the old and good goal of good story telling with occasional surprises, that used to be an earmark of American science fiction before it turned self-conscious and competitive. John Brunner is one of his finds, who is appearing more and more often in these Ace books and handling his fiction better and better all the time.

THE WORLD SWAPPERS, by John Brunner

SIEGE OF THE UNSEEN, by A. E. van Vogt. Ace Books, N. Y. No. D-391. 1959. 153 + 103 pp. 35¢

Here is more proof of John Brunner's fast-growing competence as a story-teller. In this Ace Double he outscores Old Master Van Vogt at that veteran's own wheels-within-wheels game. The Van Vogt item first appeared here in 1946 in a two-part serial, "The Chronicler," and was reprinted in Gnome Press' "Five Science Fiction Novels," in 1952. You may remember it as the story about the man who discovered that he had three eyes. After due application to his Snellen eye exercises—the mystical or occult enthusiasm around which, like General Semantics in the "Null A" books, the story spins—Michael Slade finds that he can transport himself into a parallel world of three-eyed people, where he immediately becomes the key figure in a war between the people of a beached spaceship and those in a besieged city of blood-drinkers. As always, Van Vogt snows you under with deft detail, puzzling incident, obscure and often unexplained motives, and asphalt-thick intrigue.

John Brunner handles exactly the same kind of plot far more calmly and convincingly in "The World Swappers." Again our hero is involved with forces visible and forces invisible, but what he does and why he does it makes sense in the end. We have Mankind strewn across Space in a constellation of colonized worlds, each with its own individuality and jealously guarded political and economic identity. We have a would-be emperor with considerable powers of organization and administration, who wants to pave his way to domination of the galaxy by sending Earth's surplus population as an unconscious Fifth Column to all the outer worlds. We have an underground of deeper schemers who are trying to preserve the precious individualities of the many colonial planets, and at the same time knit them together so that they can meet the alien race that is spreading toward the human sphere of influence.

All this comes to a boil when the Others—wholly alien—discover one

of the most God-forsaken of the outer worlds, frigid and barely habitable, whose Norse-rooted colonists have constructed the most unbending and unrelenting of Calvinist societies.

Where the summation of a Van Vogt yarn of this type is a kind of dazed dazzlement, Brunner's equally intricate network of scheming smooths out to good sense.

WOLFBANE, by Frederik Pohl and C. M. Kornbluth. Ballantine Books, New York. No. 335K. 1959. 140 pp. 35¢

Only in part is this a satiric dissection of our own society, as was "The Space Merchants." The part comes mainly in the beginning, in the picture of a thoroughly nauseating culture, embalmed in ritual, which has arisen on Earth with the planet's kidnaping by a visiting world. The two planets swing in almost identical orbits around the Moon, which has been kindled into a synthetic sun but periodically burns out. Then it must be rekindled, or Mankind will freeze to death in the depths of Space.

Certain rebels against the starveling monotony of their society—the Wolves—have a small, technologically operative center at Princeton, where they are prying into the nature and purpose of the blue Pyramid that oversees Earth from a perch on Mt. Everest, and its confreres on the companion world. A would-be Wolf from Wheeling is taken into the pack, but is snatched away by the Pyramids and presently finds himself wired into a network of brains and nervous systems, which the robot Pyramids use to control *their* machines.

From here on in we have a straight adventure, with Tropile and the other members of his network operating behind the scenes, through a force of kidnaped Wolves and Sheep, to break the Pyramids' hold on Earth and on their own world. When the last of the robots' original masters, a pleasant green monster, lends a hand, there is one grand final hurly-burly.

And with the world saved, there is a vague, teasing suggestion of the beauties of the kind of life Tropile led as a servomechanism. I suspect this was a Kornbluth touch, but maybe I'm doing Pohl an injustice. He's expanded the story from the *Galaxy* version of 1957—or maybe that was condensed from the full manuscript. You never know, these days.

BOMBS IN ORBIT, by Jeff Sutton. Ace Books, New York. No. D-377. 1959. 192 pp. 35¢

Here's another instance of the way the pendulum swings back: I never kept up with all the futuristic yarns in the many, many aviation magazines of Depression days, but right now the Air Force is moving back into science fiction by claiming rockets, satellites and space as their own.

This is a good action yarn, based

on the premise that Russia has an armed satellite in orbit, plus three potent fusion bombs that can be dropped anywhere Moscow chooses. The standard cadre of three heroes—one is killed, one sacrifices himself, one brings back the story, as I pointed out years ago in a little piece called "Alicia in Blunderland"—is sent up to disarm all four. And to smooth things out, they have to train in the midst of an undeclared hot war, in which Soviet missiles, planes, submarines and frogmen are doing their best to clobber the Pacific island where our rockets are being built and their demolition crew trained. Governments and populace look the other way, and pretend nothing is happening.

It's an exciting, smoothly worked out story, and a lot better than the author's previous job for Ace, "First on the Moon."

EXOTIC ZOOLOGY, by Willy Ley. Viking Press, New York. 1959. 468 pp. $4.95

The jacket calls this book "Willy Ley's Exotic Zoology," and calls it an omnibus, which it isn't—quite. Nine hundred eighty-two pages and forty-eight chapters of "The Lungfish, the Dodo and the Unicorn" (1948), "Dragons in Amber" (1951), and "Salamanders and Other Wonders" (1955) have been compressed into a little less than half the number of pages and chapters. Some chapters have been combined; some are almost unchanged except for judicious shortening; others—like that on the Abominable Snowman, who now has Soviet supporters—have been thoroughly revised and brought up to date with new material or newly discovered old material.

The Willy Ley we expect to have on the program of the 1960 Pittcon is the "romantic zoologist" of these three unequaled books. If you've never read them, get a sample from the new volume, but by all means go back to the originals for all the rich plunder of wonders that have been left out.

For the record, "Exotic Zoology" is divided into five sections of three to six chapters each, rather evenly taken from the three original books. Part I deals with the fauna of myth, including the unicorn and Willy's personal discovery, the dragon of the Ishtar Gate in ancient Babylon. Part II is about fossil creatures, Part III about mysteries of the oceans, and Part IV about some of the wonderful things—such as the dodo—that have been found on isolated islands. Part V, "Witnesses of the Past," tells the story of fossils that didn't die, such as the crazy fauna of Australia or the *Latimeria* of the East African coastal waters.

Is the Abominable Snowman a surviving giant ape-man? Are the "little people" that various reliable persons have seen, really multi-great grandfathers of ours who forgot to die? Is there a dinosaur in the African swamps? Let your imagination be centrifuged for a while, then go back

to the library or the bookstore for the whole story, with plenty more as good as this.

THE MOON CAR, by Hermann Oberth. Harper & Brothers, New York. 1959. 98 pp. $2.95.

You may have seen a preview of this extraordinary proposal in Oberth's "Man Into Space." Here, painstakingly spelled out, are the full details of the vehicle—part tractor and part popo-stick—with which the grand old man of space travel proposes to explore the surface of the Moon. Working from a permanent Moon base, he says, his car should be able to make a round trip to any part of the satellite's surface in a third of the lunar day.

In a nutshell, Oberth's Moon Car is a top-shaped, enclosed chamber stabilized by a gyroscope which also serves to store energy generated by motors, the Sun, or other forces. The car travels on a "foot" like a miniature caterpillar tractor, with its own electric motors; the car, Oberth maintains, should be able to climb a twelve thousand-foot lunar Alp on the energy stored in its three-ton flywheel and utilized through a DC motor which will reconvert some of the energy stored in its three-ton flyon the way back down.

The foot is on the end of a hexagonal, girderlike "leg" with a piston at the opposite end. This runs up and down in a shaft in the center of the car, and provides the pogo-stick feature that will enable the loaded car to jump across a chasm, bounce up a series of terraces like a mountain goat, or leap four hundred feet straight up to get out of a hole. The driver can, if he likes, bounce up and down like a boy on thin ice, to test the footing before making a major broad jump—and Oberth even describes the computer that will calculate the force and angle of his vaults.

In a jump, compressed air from a set of reserve tanks drives down the piston, leg and foot, hurling the car itself upward and—depending on its speed at the time—forward at just the right angle to clear any obstacle. When the car lands again, part of the air will be driven back into the tanks. When braking at speeds under thirty-one miles per hour, the car can actually jump *backward* to slow down.

This is one of the most amazing of the many details that Oberth carefully explains in his little book. He has applied for patents on some of them, and he itemizes the ground-test program here on Earth, that will be necessary to predict performance on the Moon.

My quarrel with the book—translated by Willy Ley, who I hope will comment on it in the next edition of his "Rockets et al"—is editorial. There are twenty-one painstakingly drawn figures: plans, cross-sections, charts, detail drawings. These should have identifying keys *with each drawing,* but they don't. Figure 19, a plan for a lunar speedometer, comes seven pages after the discussion of the device.

Certainly Hermann Oberth's fertile mind is working just as hard today as it was more than thirty-five years ago, when his great "Rocket Into Interplanetary Space" appeared.

THE CLOCK WE LIVE ON, by Isaac Asimov. Abelard-Schuman, New York & London. 1959. 160 pp. $3.00

This is another of Dr. Asimov's science books for young people. You may find it less interesting, because it is more familiar, than his previous books on chemistry and biology.

Familiar or not, you're not likely to find a clearer, simpler, or more interesting discussion of the horrible problems Mankind created for himself when he started to tell time. About the only thing he's missed—and I can't imagine why, except that it isn't part of our own history—is the Maya calendar.

I wish I'd had this book around when I was doing school broadcasts. It should be a godsend to teachers who are involved in that kind of thing now.

THE CONQUEST OF SPACE, by Wernher von Braun and Willy Ley. Vox Productions, Inc., New York. 4 sides. Monaural: DL-522. Stereo: STDL-500.522. $11.90

The four sides of this long-playing album present a fascinating conversation between Wernher von Braun and Willy Ley, covering the evolution of rocketry from 1930—when von Braun was a teen-age recruit at the Verein für Raumschiffahrt's testing grounds near Berlin, and Willy Ley was Vice President of the German "Society for Space Travel"—down to the trio of satellite relay stations on which von Braun is now working. It is Volume 1 in a projected "Science Series" from Vox, which has already included the "Rockets, Missiles and Space Travel" album.

The informal, anecdotal approach does a great deal to make the rocket story real. The "scrounging expeditions" by which Rudolf Nebel equipped the V.f.R.—the shoestring beginning of the program that led to the V-2—the Peenemunde story, and its sequel at White Sands—and finally the vision of the future, from which neither man has ever turned away—these make a unique set of records.

THE ODIOUS ONES, by Jerry Sohl. Rinehart & Co., New York. 1959. 245 pp. $2.95

Here is a pretty effective blend of mystery and horror, strung on a science-fiction thread, that holds its suspense right up to the final, critical moment when the beset survivors of the Class of '42, Dorchester College, learn who is behind the campaign of death and mayhem that is wiping them out. It may make a good movie—or a strictly routine one.

The gimmick is good: an enzyme

that acts in the human body to produce a subliminal odor or aura which terrifies some people, drives others mad with hatred, and in general sets the innocent victim against the world. As, one by one, the members of the doomed little group go down by suicide and murder, the tension grows. The hero finds himself a victim, and has to survive the attacks of dogs, cats, rats, people. Then, unfortunately, in trying to achieve a "least suspected" finesse, the author fails to make his villain or his villainy match up to the standard he has set himself.

SKYPORT, by Curt Siodmak. Crown Publishers, Inc., New York. 1959. 223 pp. $3.50

We owe Curt Siodmak applause for his "Donovan's Brain," superior as a story, film, and—I'm told—TV show, but unless this new book is the skeleton of a movie that gets top production, it isn't going to win him any extra laurels.

In theme, plot, and development this is very old-fashioned science fiction—to everyone, at least, but Hollywood, where it is probably looked upon as daringly new and different from the monsters. There's a scientist hero, an industrialist villain, two beautiful women, mystery, sabotage, secret and overt villainy, hairbreadth rescue in space, and just about anything you could want for a wide-screen spectacular.

All this revolves around the construction of a space hotel and hospital, in an orbit that will hold it over one point on Earth. The least of the scientific boners is that the author evidently doesn't know that such an orbit must be over the equator; other wild statements are tossed in here and there, apparently by way of adding verisimilitude. For anyone who has followed the satellite story in the magazines and newspapers, the result will be just the opposite.

THE PAPERBACK REPRINTS

THE ENEMY STARS, by Poul Anderson. Berkley Medallion Books No. G-289. 142 pp. 35¢

Latest incarnation of the novel that was serialized here as "We Have Fed Our Seas."

VIRGIN PLANET, by Poul Anderson. Beacon Books No. 270. 160 pp. 35¢

Although it is Beacon's policy to sex up these Galaxy selections, I think they've had sense enough to leave this one alone—that is, to let the author handle it in his own joyously pragmatic way.

THE STARS ARE TOO HIGH, by Agnew H. Bahnson, Jr. Bantam Books No. A-2048. 183 pp. 35¢

Inventors of a gravity drive try to end the Cold War by posing as extraterrestrials.

THE BEST FROM FANTASY AND SCIENCE FICTION: THIRD SERIES, edited by An-

thony Boucher and J. Francis McComas. Ace Books No. D-422. 256 pp. 35¢

Ace, bless 'em, has picked up this excellent series of anthologies with the 1952-'53 season, when the field reached its peak of popularity and there was good stuff to burn. Cover is a superb Emsh that is worth the price of the book.

NO PLACE ON EARTH, by Louis Charbonneau. Crest Books No. S-342. 160 pp. 35¢

Well done but standard Future Underground yarn. The author's suspense novels are better than his SF.

THE OTHER SIDE OF THE SKY, by Arthur C. Clarke. Signet Books No. S-1729. 160 pp. 35¢

The author's latest and one of his best short story collections, well divided between documentary and poetic.

SPACE PRISON, by Tom Godwin. Pyramid Books No. G-480. 158 pp. 35¢

The original title was "The Survivors," in the Gnome edition. Marooned on the terrible world Ragnarok, a handful of people live and build up strength to entrap their Gern enemies.

METHUSELAH'S CHILDREN, by Robert A. Heinlein. Signet Books No. S-1752. 160 pp. 35¢

The expanded novel that was here in 1941—latest of the author's "Future History" series—in which Lazarus Long and the Families of long-lived folk are hounded off the Earth.

WHEN THE SLEEPER WAKES, by H. G. Wells. Ace Books No. D-388. 288 pp. 35¢

This is rightly one of Ace's "Science Fiction Classics"—for some reason, too little read by people who know Wells only for "Time Machine" and "War of the Worlds." Graham, sleeping for two hundred years, wakes to find that he owns the world. Wells' ungainly aircraft never caught on, but his super-city was a prototype that became a stereotype in later science fiction.

THE END

BRASS TACKS

Dear John:

I have an interesting bit of news to which I hope you'll be able to devote a bit of ink, somehow, in some department of your magazine. To my knowledge, it's a first in sf.-fantasy.

As far as I know it's the first science-fiction *record* ever pressed, and I have a hand in it. Johnny Gunn is narrator of some of my very-short-short stories and of some of his own. He reads them against a specially composed musical background—composed by Don Ralke and played by a group of thirteen top musicians, including Shelley Mann and Plaz Johnson and other big names in jazz.

The record is called "Introspection IV"—as in Algebra II or Psychology III—and is being released by Warner Brothers Records, Inc., in early March. It's a twelve-inch LP, and will be available in both stereo and monaural forms.—Fredric Brown.

A talking bank for the non-blind.

Dear Mr. Campbell:

The fifth annual Milford Science Fiction Writers' Conference will be held in mid-June, 1960. The conference lasts a week, and is open to all professional science-fiction writers.

For further details, write to either Damon Knight or Judith Merril, Milford, Pike Co., Pennsylvania.

I don't know whether writers are born or made—but the conference may be fun anyway!

Dear Mr. Campbell:

I must honestly admit I was ready to join the ranks of howling multitudes when I first got wind of your determination to change the ASF name. It's bad enough that I had to leave the home of my parents, the blind type of security the Air Force gave, then the intellectual shroud which college provided to go out into the cold unfamiliar world. Now the thing that has been so familiar and unchanging is also to become a memory. Tears & Fears!

I bow to you in apology for I have been guilty of compartmentalized thinking. Many times I have left people, places and jobs because of my philosophy that life is like water. It becomes stagnant if there is no change.

The night the February issue came I blew my stack about your "hairbrain" ideas. It was the same night I came home disgusted with the hidebound operators at work who refused to do a job a new way which was faster and cheaper! "Why any blind fool could see that this new thing I put into effect was a better thing!"

Well, I'm all for you . . . Let me be among the first to cheer your effort. The more I think about it the better your idea sounds.—R. E. Schoenborn, 960 S. Jason St., Box 51, Denver 23, Colorado.

While it is obviously not true that all change is good—it is also true that no change is almost certain to be not good!

Dear Mr. Campbell:

How's this for prophecy? The December, 1944, Astounding featured an interesting article with photographs showing the moon apparently viewed from a spaceship about a hundred thousand miles out in space. The trick was to project slides of the moon onto a large white sphere, move halfway around the sphere and then take a photograph.

Now quoting from page 178:

"Our camera spaceship is in a position to see the other side of the moon —but there is, obviously, nothing in the projected image there . . . . (This) can be repaired only by waiting the necessary fifteen years or so till the first ships capable of circling the moon are built. Then we'll see the unseeable craters."—Frank A. Coulter, Forestry Department, N.Z. Forest Products Ltd., Tokoroa, New Zealand.

Well, of course, now, prophecy is our business. We do that all the time . . . we wish.

Dear John:

You have a lot to say about the

human eye as an "encoding" device in your article in the January issue; have you stopped to think of the eye as an "abstracting" device? We do not record in memory or even pay attention to every bit of sensory data impinging on the retina—or any other sense organ. Some sort of *abstracting* or *condensing—a la Reader's Digest*—must take place. Norbert Weiner, in "Cybernetics," gives reasons for supposing that a major element of what is abstracted consists of the sharp outlines or silhouettes in the scene presented to the eye. In other words, there is a black box in the visual neuro-circuitry that gives special treatment to those parts of the scene in which there is a sharp discontinuity in the kind of light striking the retina at closely adjacent angles—"close-together angles" might be a better term. This is what we should expect from an evolutionary viewpoint; the phenomena of nature that most nearly concern man or other animals—predators, prey, food plants, terrain features—present themselves as solid bodies with sharply defined boundaries and sharp discontinuities between their light-reflecting properties and those of their surroundings.

Now, if what we see is determined in part by the sharpness of contrast between the object and its surroundings, we might understand why efforts to photograph a continuously-varying band of light, that is, a spectrum, and then reconstruct it for the eye by the Land method, might give us quite different results from efforts to do the same with a sewing table, with its sharply defined pieces of cloth and spools of thread. Also, why the small yellow area of the spool of thread, no part very far from sharply contrasting surround, would give a stronger "Land effect" than the broad table cloth. Also the result reported by Land in his *Scientific American* article when he placed optical wedge type filters in front of his red and white projectors, so that the intensity of red light falling on the screen would go continuously from one hundred percent red at the far left to zero at the right, while the white would do the opposite—result: no "Land effect" but a simple pink wash.

Perhaps some of the readers would like to check out these ideas if—minor point—they have the equipment and—major point—they have some method of experimental check in mind! Readers interested in looking for monochromatic light sources might try the Klett-Summerson Corporation, manufacturers of lab spectrophotometers, who have a line of quite sharp filters at ten millimicron intervals over much of the visible spectrum; they are flat-sided blocks of glass, about five cm square by one cm thick; price, two dollars each, as I remember; but check in any lab supply catalogue.—Harry W. Hickey, 210 N. Curry Street, Phoebus, Virginia.

The big problem is, of course, to distinguish between what the eye-optic-center system does, and what

the mind does with the report afterward. A hypnotized subject has nothing wrong with eye or optic center—but does not see what is before him.

Dear Mr. Campbell:

Concerning the change from Astounding Science Fiction to Analog: Fact and Fiction, I would like you to know that I am pleased with the change. It's long overdue.

I'll be honest with you; I have been very interested in your articles concerning the Land Experiments. Upon reading about them for the first time in an earlier issue of Astounding, I promptly showed the article to a good friend of mine. He, too, was interested—until he saw the title.

Now you know and I know what the title means; we understand it. I myself have nothing against it. But he figured, like as not, that the article was some wild, fantastic yarn in keeping with the title of the magazine.

But several months have passed. I showed him the February, '60, issue today, and he was greatly interested. And best of all, he didn't shy away from the name.

May this be the first of a long and respected future.—Bill Gattis, Graduate, National Radio Institute, Student, New Mexico State University, Box 1892, University Park, New Mexico.

That, in essence, is our reason for the change!

Dear Mr. Campbell:

I want to enter my violent objection to the proposed change of name of my favorite magazine. You would hear no murmur from me if the name were to become Astounding Stupendous Super Science Stories of Fabulous Fact and Fantastic Fiction—or, for short, ASSSSFFFF—but as for the name Astounding, don't mess with a winner!

You have made the statement that *no known color photographic process* can reproduce a spectrum. This is not true; there *is* one and only one process which can produce an accurate and even vivid duplicate of a spectrum. This process uses no dyes, no filters, no special camera, and requires only one exposure, rather than the two required by the so-called Land process.

The process to which I refer is the Lippmann process, discovered in eighteen-something-or-other. (Different books on Physical Optics give various dates for the invention.) Herr Lippmann coated a glass plate with a thin uniform mirror of mercury and then carefully laid down on this uniform coating of very, very fine grain photographic emulsion—yes, plain old-fashioned silver halide in gelatin. He exposed the plate in a camera, and then developed and fixed it in the usual way, taking care to preserve the fine grain.

You ask "Where does the color come in?" Well, during the exposure the mercury mirror causes standing waves of light to be set up within the emulsion. The result is that the ex-

posed silver is not uniform but is in layers through the emulsion. The separation of the layers is proportional to the wave length of the light. When we view the final picture, light is forced through this same standing wave pattern, and only the original wave length reaches our eyes. The resulting colors are said to be brilliant.

This color photography process has been swept under the rug and forgotten for nearly a century, with the plea that commercially made film could not be fine enough. No doubt this was true formerly, but I doubt the validity of the excuse today.

Incidentally, *Scientific American* tells me that the so-called Land process was used and reported by George Albert Smith and Charles Urban in the year 1909. They made color movies.—Richard George, 308 N. Roslyn, Westmont, Illinois.

A lot of people regret the abandonment of the old Astounding title. It was a winner. Yes . . . but what was a winner? The name? Or the magazine? It started as "Astounding Stories of Super Science," you know.

And even winners eventually stop winning if they don't change!

Re the Lippmann process: Correction accepted. "No commercial process known." I should have said. Lippmann's worked with glass plates, and hand craftsmanship. If the gelatine, after processing, did not match its before-processing thickness by one length of red light . . . what would the colors be? What effect would humidity variations have through swelling the gelatine?

The two-color process was known even before 1909. But Land was the first to make thorough experiments in terms of "What is the process of human vision?" *rather than simply color-photography. Land's research is fundamental, not simply engineering.*

Dear Editor:

Before I go any further, let me compliment you on that excellent editorial in the January issue of Astounding. You are right, but I am wondering just what *are* some group experiments? It's all very well to say let's go back to group experiments, but what are some? The one you mentioned, not that there was only one mentioned, about the table tipping ought to be disqualified. The reason for that is simple, it is and was all too easy to fake table rising with a simple movement of the knees. I believe you will find this trick mentioned in any beginners book of magic tricks. This method of using the knees probably accounted for more table tipping than psi powers ever did, but if I'm wrong I'm sure you'll correct me. But what about it; you can't very well have group experiments if there are no experiments to try. You name some experiments, then maybe we can do something about discovering psi and its properties.

Second thing I want to say before I go on. Way back there, in November, 1957, through parts of 1958 to be exact, you asked readers to send in copies of Finagle's Great Unwritten Laws. I believe you stated you would print a list of these laws when they were completed. Well now, it's been a good long while—excuse mountain expression—since you asked your readers for those laws, and as yet I haven't seen any copies of the Laws in the pages of your mag. What gives? I'd hate to have to say that you were the kind of editor who didn't keep his word, so how about publishing Finagle's Laws for the waiting readers? There is an easy out for you back there I see, so how about printing what Laws you have collected so far, even if they are as yet uncomplete?

Now, on to this issue. "Stress Pattern" gets first place on my list. Good and much better than the average hack work Silverberg puts out. "Deathworld" next, I always enjoy a good adventure novel, especially if it is as well written as this one is. Let's keep those serials rolling, I love 'em. "Attention Saint Patrick" comes next, fairly enjoyable. "The Burning Bridge" hits fourth place. Average. "Viewpoint" fifth and would have been higher if the ending hadn't been so evident from the second page. "A Rose by any Other Name" must by necessity take last place. A good issue.

I quite agree with Sandra Fulton, your letter column has hit bottom. I suggest a change. Not that you should immediately switch to those shortie compliment filled-things *Amazing* seems so fond of. How about some comments on the mag? How about a little less math and science I can't follow all the way through? It leaves me hanging wondering what happened.

Now I'm through giving friendly comments. At the bottom of Page 82 you made a statement saying that the name Astounding would go under in favor of something called "Analog Science Fact and Fiction." I must comment on your stupidity. For thirty years now Astounding has been the symbol of the finest science fiction available. In that thirty years your stories have appeared in numerous anthologies, all proudly bearing the acknowledgment that the stories first appeared in Astounding. Now you are going to throw this name, which has become synonymous with the science-fiction field, on the scrap pile in favor of a thing you choose to call "Analog." I had been under the impression that you were a man of more than the average intelligence, and who was willing to accept and could point out to some extent, public opinion. In fact I have heard that your mag depends on public opinion. Well, if that be so, then I have a public vote, and I cast my vote here and now against the name "Analog." If you want to publish fact, buy *Scientific American,* I'm sure they'll sell for the right price. If you feel it necessary to have fact and fiction, then keep the name Astounding change it to Astounding fact and fiction if you have to. A number of SF

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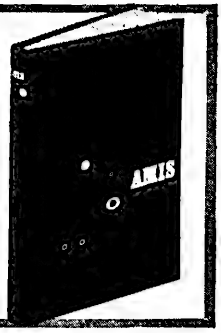

fans, myself included, have become sentimentally attached to the name Astounding. We like it, enjoy it and rely on it. It's a show piece, we can proudly point it out, and say, "look, see that magazine? It's been in business thirty years, through thick and thin, and still publishes the best in science fiction." Analog may be the same kind of mag that Astound is, but if that's so, why change the name? If it's different, change the magazine, not the name, or publish another magazine altogether, besides Astounding. The fact that you are willing to discard the name and the reputation that goes with it in one sweep for this new thing amazes me. I can't wait till Street & Smith brings out another magazine to match this new one, Mantissa Fiction and Fact, to match your Analog. Nuts to that. If it's pages you want, you surely don't have to kill the name for more pages. Cut it back to 132 pages if you have to, but keep the name Astounding. You can put me down against the name change, and I will urge my friends through personal visits and correspondence to voice an opinion on this subject.—Robert Jennings, 3819 Chambers Drive, Nashville 11, Tennessee.

1. Any experiment can be faked, of course. But when you're experimenting for your own information —who are you kidding?

2. Finnagel's Laws were published in Brass Tacks—and picked up and republished in half a dozen journals, including the IRE Student Quarterly, Design Engineering *and others.*

3. True that our regular readers know what Astounding has meant for thirty years. But how about the others 169,900,000 Americans?

THE END

(*Continued from page 7*)

per cent efficient mass-energy converter for energy supply. We'll add that it can project the released energy with one hundred per cent efficiency in a desired direction. The energy we'll say is projected as photons; that gives the ulitmate in exhaust-gas velocity, and, therefore, the maximum possible specific impulse. It'll give us the greatest possible thrust per pound of reaction mass.

Now let's imagine one of the commercial rockets taking off from Earth on its way to Mars. We'll say it's a small, ten-ton ship. (Commercial airliners weigh sixty tons.) To take off, it must exert a thrust of not less than one gee—so, when the mass-converter is turned on, radiant energy drives out with momentum enough to provide a greater-than-ten-ton thrust. Instantly, the launching pad, atmosphere, and rock in the beam is converted to a totally-ionized plasma by the quasi-solid beam of radiation. By the time it's one hundred miles up, six counties have been volitalized; at one thousand miles it's fried most of a continent.

E. E. Smith sort of got around that, in his stories, by having both anti-gravity and inertial neutralizers—to which he had to add a system of creating reaction mass synthetically, even so.

Nuclear rockets aren't going to do it, either; it's true the use of reaction mass increases in efficiency with higher ejection speed—but the reason that photon-rocket fries a continent on take-off is that the energy efficiency goes to blazes . . . quite literally. If you double the ejection speed of your mass, you get double the thrust—and at only four times the cost in energy!

By the time things get to really high velocity exhaust, the energy-spillage is so terrific that (a) nuclear energy isn't adequate, and (b) anything you're taking off from gets annihilated.

Rockets, like cyclotrons, are wonderful, irreplaceable, research tools. But nobody ever hopes to produce useful atomic power from cyclotrons. It takes a totally different approach.

Rockets never can be used to *develop* space. For that, a true space drive is essential. The reaction principle can't be used.

The article this month concerns the Dean device; I believe it is a true space drive. That is still a moot point, however; nobody, except Dean, has been willing to test the thing, as I have explained in the article.

But we can do some analysis as to the meaning of a space drive in terms of the Solar System.

Now any usable space drive must be capable of lifting a vehicle from the surface of the Earth; it must, in other words, be capable of delivering a thrust yielding a one-gee-plus acceleration in the vehicle. Earth's surface gravity is approximately nine hundred eighty centimeters per second per second; this makes it handy to call the space drive's acceleration one thousand centimeters per second per second.

It's *not* a rocket we're talking about now; it's some kind of device

that yields thrust without reaction against local matter. If it can lift at all, we assume that the engine is capable of hovering flight—and, therefore, of sustained thrust-generation. This means that, instead of moving at constant velocity, it will move at constant acceleration. Its progress, then, will be exponential-with-respect-to-time, not linear, as is the case for all present vehicles, including rockets from the moment of burn-out.

The following table gives the time-of-flight from Earth to various Solar planets under the assumption of a one thousand centimeters per second per second drive operating continuously—accelerating to the turnover point, and decelerating at the same rate to landing.

Times to the Planets at an Acceleration of 1000 cms/sec^2 1g=980 cms/sec^2

Earth to	Time to turn-over	Velocity at turn-over	Trip time	Distance Kilometers
Moon	1.9 hours	Kilometers/Sec. 63	3.8 hours	400,000
Mars (Near)	0.817 day	710	1.63 days	50,000,000
Mars (Far)	2.26 days	2000	4.5 days	380,000,000
Venus	.733 day	632	1.46 day	40,000,000
Asteroids	2.31 days	2000	4.6 days	400,000,000
Jupiter	3.1 days	2660	6.2 days	700,000,000
Neptune	8.17	7080	16.3 days	5,000,000,000

The relevant simple-algebra formulas are: Velocity, V; at any time T; for any acceleration a: $V=aT$ Distance covered, S; at any acceleration, a; in time T: $S=\frac{1}{2}aT^2$

To calculate the distance covered in the *n*th day's run:

$$S=\frac{1}{2}a(2n-1)T_d^2$$

where S is the distance, a the acceleration, n the number of the day considered, and T_d the length of a day.

Because of the exponential effect of constant acceleration, the Earth-Mars run, with Mars nearest Earth, is almost three days—while with Mars in the worst possible position, it's only five days. On the longer run, you have a chance to build up higher velocity, which naturally cuts down the effect of increased distance.

Even Neptune, you notice, is only a bit over two weeks away; a round trip to Neptune will take less time than a round trip to Australia via modern ocean liners.

The trips will, of course, be made with nuclear-powered engines . . . hydrogen-fusion powered. The necessary hydrogen-fusion reactor is already available, and cost us nothing whatever; the Sun will supply all the power needed.

Remember that, in space, plastic-film bubbles can be blown to immense size very cheaply and easily—and can be silvered just as readily. At Earth's distance, they would yield about one horsepower per square yard; out to the distance of the asteriods, at least, solar power for a full one gee acceleration would be practical.

Beyond that, it might be a sort of compromise; the bigger the mirror, the more power you collect—but if you use a one-gee drive, the mirror has to be stiffened with support members, and those might get a little difficult for a mirror big enough to yield full power, under one gee acceleration, at Neptune's distance. You can either ease off to a 0.1 gee drive and use a large mirror, or go on ship's-power drive, using a fission engine.

I think it is clear from the tables, and the map, that it's inappropriate to think of the Solar System in linear terms; it's a logarithmic, an exponential, system, and should be mapped that way. It's about three times as far from Earth to Neptune as from Earth to Mars . . . using a true space drive of any kind at all!

The figures I've computed are not accurate; I've made no allowance for Solar gravity drag, which would cut the net acceleration somewhat when going away from the Sun. But the Sun's surface gravity is roughly twenty-five times Earth's; that's at 400,000 miles from the Sun's center. At 2,000,000 miles, then, Solar gravity is about one gee, and at Venus' distance, it's below 0.1 gee.

And, of course, the tougher Sol's gravity field is, the more generous he is with the light-energy needed to power the engines. THE EDITOR.

THE END

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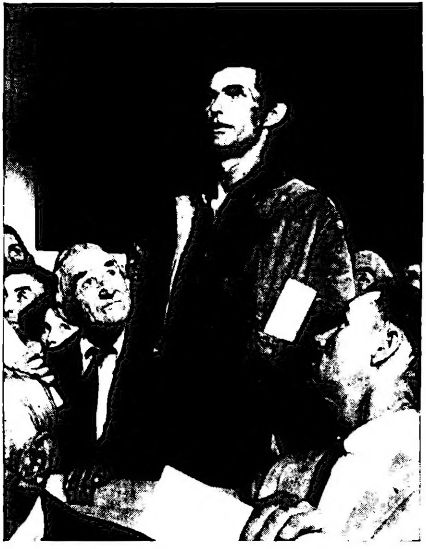

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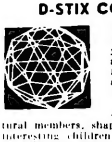

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